The Builder.

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Reason and Tradition.

WE are possibly in this present decade coming to a kind of parting of the ways in regard to architectural design, when the question must be answered—and the effect of the answer will operate for some time to come—whether modern architecture is to be carried out according to the dictates of reason, or choice, or by the acceptance of traditional treatment. The century just past may be regarded as an era of experiments in archæological imitation; experiments which, in the case of modern Gothic especially, were commenced with great hopes and in the belief that we had now found the right course, that of developing our indigenous architecture; and which have successively run out their course and led to the conclusion that life cannot be put into modern architecture by any such revival process. The Gothic revival, however, was actually regarded by its originators as the carrying out of the tradition of English architecture, which had been broken into by the Renaissance revival of Classic forms; but in this respect, as we can all recognise now, they deceived themselves. If the Gothic revival had consisted in taking up late Gothic at the point at which it had been abandoned and endeavouring to develop it further from that point, it might have claimed to be a traditional architecture; but what was actually done was to choose a certain phase of Gothic and reproduce it; which was mere revival.

Then what is that influence of tradition, on which Mr. Blomfield lays a good deal of stress at the conclusion of the chapter on Palladio in his "Studies in Architecture"?* Mr. Blomfield sums up Palladio in a manner rather different from that in which he has usually been regarded. He characterises the famous Italian architect (who may be called perhaps the Vitruvius of the Renaissance) as one who was desirous not merely to reproduce Roman forms, but "to find in the past the guide for the future"; and he compares Palladio's relation to Italian architecture with that of Chambers to English architecture. Both men were purists with little genius; but both made a conscious and deliberate stand against the merely fashionable license of their time, and endeavoured to recall the art of architecture to the graver practice of the past. This, says Mr. Blomfield, "is a service that needs doing again":—

> "The classical tradition was the last effective influence in England, but that influence practically came to an end a hundred years ago, and the efforts of English architecture have given us nothing in its place except varieties of false sentiment. With rare exceptions, the architectural exploits of the XIXth century were of the nature of guerilla fighting: they may or may not have been magnificent, but they certainly were not war. The work of steadying English architecture has yet to be done, if it is to resume its rightful place in the great procession of history."

Yes: English architecture certainly needs to be "steadied," if we look at the manifold vagaries of style which one sees about in the streets, and even in the designs which have undergone a certain amount of selection for the annual Royal Academy Exhibition. But it is rather strange to find the example or tradition of the Renaissance, half a century ago supposed to have been the curse of English architecture, now suggested as furnishing the saving element of tradition as the guide for our future course. Is there anything in this, or is it only another delusive hope? An able and original contemporary mind has proposed exactly the contrary course; the deliberate hunting down of all school detail—columns, pilasters, cornices, and mouldings—and beginning afresh on the bare materials of construction, to see what we can make of them for our own purposes. That sounds attractive, as a ground for new developments; the drawback is that it is impossible. The human mind cannot shut itself out from precedent, nor can it be long content with bare walls and roof—if reforming architects were content, their clients would not be; and when we began again endeavouring to give architectural expression to these bare walls, we should find ourselves almost unavoidably falling back on something very like the old discarded forms of detail, the difference perhaps being only in inferiority and not in improvement. And, as Mr. Jackson pointed out in his Royal Academy lectures, the mere fact that buildings for the same general purpose, in civilised societies, require the same nature and arrangement of interiors, inevitably stamps upon architecture a certain conservatism. And as for the direct endeavour at originality in detail, we have seen

* "Studies in Architecture." By Reginald Blomfield, A.R.A. London: Macmillan & Co. 1905.

too much of what that may lead to, in the disease called *art nouveau*.

The remark that the Classic tradition was "the last effective influence in England," though it came to an end one hundred years ago, puts one on thinking whether, after all, the classical tradition is not the most permanent element in civilised architecture. Column and entablature have played a larger part, have been a more persistent element in architecture, than any other principle of structure and expression; even in Gothic architecture the column and capital, or shaft and capital, are directly derived from the Classic column. Gothic architecture was a development out of Roman; after it had passed through all its development, the minds of educated men seem to have had a disposition to recur to the Classic order again as a more cultured form of architectural expression. Its world-history is far longer than that of Gothic, and it is almost a question whether the Classic column and capital, at all events, have not become in truth part and parcel of architecture itself. And the adoption of the Classic tradition, while thus bringing us back to what has proved the most permanent element in architectural style, does not preclude novelty and originality of treatment, as the example of the Italian and French Renaissance architects, as well as of Wren and the best men of his school (such as Hawksmoor and Archer), very clearly shows. These men were not mere copyists; they worked out their own architectural conceptions with materials borrowed from Classic architecture; and of this cult they certainly did not exhaust the possibilities. There is room therefore for further development on the basis of this oldest and most widely-extended tradition of architecture, the maintenance of which may, as Mr. Blomfield seems to suggest, prove itself the steadying influence which English architecture requires to restrain it from wandering into aimless vagaries. It has proved such an influence in France. Whatever criticism may be passed on the too Academical tendencies of the Ecole des Beaux-Arts system of education, the fact remains that the French have a school of architecture and we have not.

Mr. T. G. Jackson, in the book already referred to, in which he has published the series of lectures delivered to the students of the Royal Academy this year,* suggests an entirely different principle for obtaining the "steadying" influence on architecture which both he and Mr. Blomfield, from their different points of view, unite in desiring, by bringing all details in architecture to the test of "reason," using the word in its practical and not in its abstract sense. Our readers are already acquainted with much of the substance of these lectures, as we published a pretty full *résumé* of them from notes taken at the time they were delivered; but it is well worth while for all readers interested in architecture to have the text as a whole, accompanied by the numerous illustrations. The book is one which ought (if they will take the trouble to study it) to be especially useful to amateur students of architecture, since it brings before its readers, in language intelligible to every educated person, a view of architecture with which all architects who are worth anything ought to be familiar, but with which the public generally are very unfamiliar. The title, "Reason in Architecture," may be rather misleading, as the author by no means intends to inculcate the view that architecture or architectural style is the outcome of a process of mental reasoning; in fact, he seems to us scarcely to allow enough influence to the intellect in the evolution of style, or of some styles at all events; for in the Greek orders of the purest type there does appear to us to be evidence of a good deal of what may be termed abstract thought in regard to architecture; the selection and elaboration of features or style on intellectual grounds. And we should say also that the form of the interior architecture of St. Sophia was the result of a deliberate mental conception exercised beforehand, and to which the building was made to conform.

What Mr. Jackson really aims at showing is not so much that there is Reason as that there are reasons for everything in architecture; reasons arising mainly out of conditions of structure and materials. This is nowhere so true as in respect of mediæval architecture, and it is on the history and practice of mediæval architecture that Mr. Jackson's thesis is mostly built. In his Chapter III. he announces what to many readers will at first sight seem a paradox, to the effect that the subordination of arches, which is so peculiarly characteristic of Gothic as opposed to Roman building, and the magnificent effect produced by it in the great sculptured porches of the French cathedrals, was not a result of invention, but of a process of evolution arising in the first instance out of the poverty and restricted means of the Romanesque builders, who had no appliances for conveying or handling the great masses of stone used by the Romans, and were thus compelled to build their arches ring by ring of smaller stones, the first ring moreover serving as a centring for the next one, which was built half on it and half over-sailing. The process, and its results when more elaborated and ornamented, are illustrated by a number of diagrams and examples. That mediæval architecture is the architecture of small stones has been often remarked; but the initial practical reasons for this, and their ultimate effect on the more elaborated architecture of the later Gothic, have never been illustrated in so complete and logical a manner. In the second chapter the history of the development of the mediæval carved capital from the Classic capital is traced out in a similar manner, through a number of examples, attention being called, among other points, to the curious retention, in some early French Gothic examples, of the hollow Classic abacus beneath the square abacus derived from Byzantine sources, which had become the real impost; the Classic abacus beneath being a useless survival, not yet got rid of. The gradual change from the Classic to the Gothic form of leafage in the capital, in great measure the result of the use of stone instead of marble, is also traced out through a number of examples. But we cannot agree that the Southwell capital on Plate IV. retains the supporting character which belonged to the Classic and to early Gothic capitals. Between the Early English capital from Wells on Plate III. and the capital on Plate IV. there is in the æsthetic sense a gulf. The great beauty of the Early English foliage is that it combines freedom of line and an appearance of growth, with the appearance of giving support; moreover it is a conventional treatment exactly suitable to stone carving. The Southwell capital, beautiful as it is in a sense, is an attempt at realism in a material in which realism was impossible, and it is not a true growth from the bell of the capital; it is foliage *appliqué*.

It is noticeable that while Mr. Blomfield's book (to which we shall return) is almost entirely devoted to studies in Renaissance architecture, which is more especially the architecture of tradition, Mr. Jackson's thesis of practical reason or cause as the basis of architectural development is almost entirely illustrated from the development of Gothic architecture. This is natural, for Gothic above all other styles is that in which the details and development are influenced by structural causes. On this account we entirely agree with him in his criticism on an article in the *Edinburgh Review* (evidently not written by a real student of architecture) in which it was asserted that a style so forcible as Gothic supposes the existence of a distinct thought—"it must have existed in the minds of its builders before it existed as architecture." No one who had studied the development of Gothic out of Roman and Romanesque, step by step, could have written such a sentence. As already observed, there may have been styles, or separate buildings, which were in part the result (*pace* Bishop Berkeley) of an "abstract idea" previously conceived in the mind. But most assuredly Gothic is not of them. It was the result of a long series of struggles with structural problems.

It is for this reason that the Gothic style was so well suited to form the basis of the lesson enforced in Mr. Jackson's book, which is not without an object and an application. The object is to show, to the general reader especially, that architecture is not to be regarded as design capriciously evoked as a matter of invention; that architectural style and detail are evolved out of and are the expression of structure; and indeed that mere structure, as in the case of the three-aisled timber barn at Harmondsworth (illustrated in one of Mr. Jackson's plates), may rank as a work of architecture, awakening in us emotions weaker, no doubt, but of the same kind as those that move us when we stand in the nave of a great minster. We might instance the Forth Bridge as an example on a greater scale. The essential thing is that the structure should be of a bold and of a capable description.

"Why do such structures as the crown steeples of Newcastle, Edinburgh, Aberdeen, and St. Dunstan-in-the-East excite not only surprise and curiosity, but also admiration? It is not that they are more beautiful than other steeples, for there are hundreds of steeples that surpass them in that respect. It is not merely that they are novel and surprising, though no doubt that has its effect on the observer. But the main

* "Reason in Architecture." Lectures delivered at the Royal Academy of Arts in the year 1906. By T. G. Jackson, R.A., M.A., F.S.A., Hon. Fellow of Wadham College, Oxford. London: John Murray: 1906.

impression they make is that of constructive daring, and of a difficult problem audaciously challenged and successfully solved. Such structures will never be forgotten by the most casual observer, and in their case no one can deny the interest which a feat of architectural construction is capable of exciting.

When, therefore, we plead with the unprofessional lovers of architecture that they ought not to be satisfied with knowing the mere outward forms of the style they affect, but should look a little deeper and try to trace their meanings as a step to a truer appreciation of their beauty, we can assure them that there is no mystery about it, but that if they were to analyse the impression which they receive from what they see, they will find that they have already been in the habit of applying, although imperfectly, those very tests which we would have them recognise more fully."

The moral is that we should regard modern architecture not as a mere outward form, governed by caprice or the taste of the moment, but as the expression of the structure which properly belongs to the building. And the author points out what a sham and pretence much of our modern architecture is from this point of view, with its imitation half-timbered structures consisting only of ornamental planking which has nothing to do with the construction, and its concealed iron-work, which is the real construction but is not allowed to appear, being masked by a pretended structure of masonry so designed that it could not really stand but for its concealed iron supports. In London this kind of sham building is being carried to such an extent that except in a few public or Government buildings we shall soon have no true architecture left; wherever a new building for business purposes is going up, the first thing we see is this scaffolding of iron standards and girders, the nucleus for the sham architecture which is to surround it. Formerly walls were built first and girders, where required for large floors, were placed on them or built into them as they went up; now the iron standards and girders are built first and the walls built as screens round them. And then, as Mr. Jackson points out, the walls are decorated with a profusion of showy and cheap ornament, and domes and oriels with no visible support and having nothing whatever to do with the construction. If iron is to be the essential construction of the shop building, let the architectural treatment, as Mr. Jackson urges, express the fact, and not continue, in a commonplace and gewgaw manner, a method of design proper to masonry construction. Among other suggestions, he asks why should not a visible iron framework be used, filled in with whatever material is desired for walling, just as half-timber work used to be used in the days when it was a real construction and not an archæological pretence; the iron framing taking the place which the oak framing once took. That is an idea worth consideration; though we do not think (nor, we gather, does Mr. Jackson) that there will ever be developed a satisfactory architecture of which iron is the main constituent. The main lesson is, however—consider architecture from the point of view of structure, and ornament as only desirable so long as it is really good and so long as it assists, or at all events does not contradict, the expression of structure. To the class of commercial architects, as they may be called, who erect most of these sham structures, it is probably useless to appeal; but if Mr. Jackson obtains anything like a hearing from the general public, his book may lead to a demand for something better.

There are various points in Mr. Blomfield's book to which we intended to refer in connexion with our subject; but we must consider these in a second article.

NOTES.

The Latest Earthquake.

THIS year has been undesirably memorable in respect of physical disturbances, for the great eruption of Vesuvius was rapidly followed by the devastating earthquake of San Francisco, and that event by the equally destructive convulsion in Chile. According to the latest accounts that have reached this country the entire city of Valparaiso is in ruins, and, as the result of repeated shocks, very few, if any, buildings have escaped injury. As happened at San Francisco, the work of destruction was completed by fires that broke out in many parts of the city. The supply of gas ceased, probably owing to fracture of the mains, and the electric light failed, thus leaving the city without light during the night hours except that from the burning ruins. The lack of water and the unwillingness of labourers to assist in extinguishing the flames and in the work of rescue added to the troubles of the authorities. At Santiago de Chile a most severe shock occurred. Numerous public buildings and private houses collapsed or were seriously damaged, but fortunately the fires that broke out in various quarters were promptly extinguished by the firemen, whose labours were to some extent assisted by heavy showers of rain. Although the damage in the two chief cities is more striking it is probable that the loss of life in the smaller towns and the district generally between the Andes and the sea will be shown by later news to have been of far greater extent. In one respect the recent earthquake differs from previous upheavals on the South American coast. The earthquakes of 1724 and 1746, by which Lima was destroyed, were accompanied by a rising of the sea in gigantic waves, and similar disturbance was evidenced at the time of the Chilian earthquakes in the early part of last century.

The Column of Trajan.

EXCAVATIONS by Commendatore Boni outside the base of the pedestal of Trajan's column have led to some interesting results. The cavity made in mediæval times was found to be about 7 ft. 6 in. deep, and to extend nearly to the centre of the pedestal. This excavation and another one at the south-east corner of the base have been filled up with concrete, thus restoring the foundations of Apollodorus to their original security. Explorations beneath the pavement of the Bibliothecæ court, which flanked the column on either side, have revealed the existence of an ancient paved road buried beneath the area of the Alpian forum, and which was cut through by the foundations of Trajan's column. The road apparently ascends towards the Quirinal at a gentle gradient, and may possibly be the *Clivus Fontinalis*: If, as seems feasible, this road was constructed during the same epoch as the tomb of Bibulus its existence is sufficient to prove that there never could have been a ridge of rock connecting the Quirinal and Capitoline hills, as suggested by the customary reading of the inscription—*ad declarandum quattæ altitudinis mons et locus tant[is ope]ribus sit egestus.* Commendatore Boni is now making investigations at the tomb of Bibulus, with the object of finding the road upon which it stood for comparison with that intersected by the column of Trajan:

Damages Under the London Building Act.

IN the case of Adams *v.* Mayor, etc., of St. Marylebone the question was raised whether in an arbitration under sect. 91 subsect. 1 of the London Building Act, 1894, the arbitrators could award special damages for loss of trade. The defendants, the building owners, were raising a party-wall, and the plaintiff, who occupied the adjoining premises as a restaurant-keeper, claimed damages for loss of lodgers and customers by reason of the fact that the chimney was affected by the building operations and fires could not be lighted. The Court held that the powers of the arbitrators under this section were limited to structural damages. A perusal of this section strongly supports this view apart from the decided cases. The section runs, "In all cases not specially provided for by this Act where a difference arises between a building owner and adjoining owner in respect of any matter arising with reference to any work to which any notice given under this part of the Act relates," the surveyors "shall settle any matter from time to time during the continuance of any work to which the notice relates in dispute between such building and adjoining owner with power by his or their award to determine the right to do, and the time or manner of doing any work and generally any other matter arising out of or incidental to such difference." The court pointed out that by sects. 93 subsect. 3 and 95 (2) (*b*) other classes of damages were "specially provided for." This section, though limited to structural damage, does not take away the right of the plaintiff to take the ordinary legal proceedings if he has sustained damages, giving a right of action at common law.

Radium.

SINCE the appearance of Lord Kelvin's letter Sir Oliver Lodge has written to the *Times* in support of the theory that radium is capable of transformation into helium. The evidence quoted for the generation of the latter substance is not very convincing. In the first place it is said that Rutherford measured the magnetic deflextion of the Alpha rays shot off by radium emanation, and made certain inferences which apparently were afterwards considered as facts. Then Ramsay and Soddy examined the spectrum of a minute quantity of radium emanation in a vacuum tube without finding any indication of helium, but in the course of a day or two the helium spectrum gradually made its appearance. This isolated experience is relied upon as a proof that no helium existed at first in the radium. Physicists are aware that the spectrum of a vacuum tube is

somewhat liable to eccentricity, and may change entirely under the prolonged passage of electric current. Gases at first indicated become no longer evident, and others appear that did not at first show a spectrum. No positive explanation has been found for these phenomena, but the fact that they are known to exist is sufficient to convince prudent scientists that the interesting observations so far made are not sufficient proof of the transmutation hypothesis. Moreover, we are not yet sure whether radium is not itself a compound of helium, a possibility that is directly suggested in the second edition of Rutherford's work on "Radio-activity."

Railway Accidents.

THE Report of the Board of Trade on Railway Accidents during the year 1905 has just been issued. The number of passengers killed in train accidents was 39, a greater number than in any year since 1889, but 38 of these deaths were attributable to four accidents. There is reason to fear that the current year will also be one comparing unfavourably with its predecessors in this respect. The number of persons injured in train accidents was curiously below the average despite the above fatal accidents. The injured numbered 396. The numbers of persons killed and injured in train accidents and owing to the movement of trains was 1,099 and 6,459 respectively, the average for the previous nine years being 1,149 and 6,651 respectively. It is satisfactory to note that the casualties to railway servants show a decrease. For the nine years ending 1904 they averaged 1 in 70, whereas in 1905 the proportion was 1 in 81. These figures are also considered in the Report, with reference to the causes of the casualties, in an interesting manner.

The Saltcoats Railway Accident.

UNLIKE some recent railway accidents the mishap that took place on Saturday last at Saltcoats on the Glasgow and South-Western Railway was the result of clearly definable causes. Briefly stated, the facts are that the breakage of an axle in the locomotive of a mineral train had the effect of blocking one track of the line so that up and down traffic had to be conducted on a single track. Owing to the number of passengers the 2.10 p.m. train from Glasgow was divided into two portions. The first train had arrived at Saltcoats, and while being shunted from one line to the other was run into by the second train. It is explained by the railway company that the reason for the rapid succession of the second train was largely due to the fact that traffic was being conducted on the pilot system. This does not strike us as a satisfactory explanation by any means. The curve leading to Saltcoats station is so sharp that an incoming driver cannot possibly see where he is going to, and the fact should have been sufficient to indicate the necessity for special precautions. When the Board of Trade inquiry takes place we shall know more exactly whether the railway company adopted adequate measures to provide for the safe working of the line under the exceptional circumstances here mentioned.

Expanded Cast Iron.

A NEW process for which the Elliott Cresson gold medal has been awarded by the Franklin Institute is based upon the permanent expansion of cast iron under the influence of heat, a phenomenon to which attention was directed in our "Note" of May 7, 1904, relative to the Baltimore fire. In the process to which we refer the bar of iron, whose volume it is desired shall be increased, is alternately heated and cooled several times. As a proof of what could be accomplished in this way, two bars were cast in the same mould, one of them being kept for the purpose of reference; while the other was expanded until its volume had been increased by 46 per cent. When the bars had been machined on one side very little difference was observable in the structure of the metal. It is stated that important applications have already been found for this interesting process, but we do not see that cast iron expanded in the manner described can possess any advantages that are likely to repay the cost of treatment, except perhaps the decreased liability to expansion during outbreaks of fire when employed in the form of window and door frames.

Concrete-steel Column Tests.

THE results of a series of tests upon plain and reinforced concrete columns, conducted by Mr. James E. Howard at Watertown Arsenal, are of more than ordinary value. The columns were of sufficient size to eliminate the errors practically inseparable from laboratory tests upon small specimens, and the varied character, both of the concrete and the reinforcement, renders these tests particularly useful for purposes of comparison. One very interesting portion of Mr. Howard's investigation was that relative to the influence of angle bars used in the form of longitudinal reinforcement. As might be expected, such sections were found to be peculiarly effective in adding stiffness as well as strength to the members in which they were embedded. Another point made clear by Mr. Howard is the superior stiffness of columns with longitudinal bars in comparison with those simply reinforced by steel hooping. It would be wrong, however, to infer from this fact that longitudinal reinforcement should be used alone, for it has been conclusively proved by numerous tests how valuable is the effect of hooping in adding to the bearing capacity of concrete. The real nature of this action is well illustrated by the tests made by Mr. Howard upon large-sized hooped columns at Watertown Arsenal.

Rights in Salt Mines.

THE case of the Salt Union, Ltd., *v.* Brunner, Mond, & Co., Ltd., recently heard in the King's Bench Division, raised a novel point, but since the judgment alone took up four columns of the *Times* we can only draw attention to the decision by a few words in these pages. The question involved was whether an action will lie for the abstraction of brine by the owners of one salt mine in working their own mine from the mines of neighbouring owners. The defendants were lawfully working their own mines, but in so doing were abstracting brine from neighbouring mines. The finding of the Court seems to amount to this: That for many years before either the plaintiffs or defendants had acquired their mines, nine of the mines owned by the plaintiffs were connected by underground channels, which no human agency could close, and which would enable brine from other mines to collect and circulate, and that pumping operations on the plaintiffs' premises would inevitably lead to an abstraction of some of the brine from other mines. This condition of affairs was the result of mining and pumping operations and consequent flooding of old mines, and had existed for many years, possibly even for centuries. In these circumstances the Court held that the defendants had committed no actionable act, and the plaintiffs were not entitled to an injunction. Although the case resembled those concerning underground water the condition of things was artifically created by the mining operations. A claim for subsidence caused by the pumping operations also failed on the ground that the subsidence complained of could not be directly or exclusively connected with the defendants' pumping operations.

Waterworks and Mining Rights.

THE case of The Corporation of Manchester *v.* The New Moss Colliery, Ltd., commented upon by us in our issue for December 21, 1904, has been carried to the Court of Appeal, and the decision of the Court below has been reversed. The Manchester Corporation in 1875 purchased for the purposes of their waterworks two estates, one from the Earl of Stamford, the other from another owner, Taylor. This latter estate was conveyed to the Corporation with all mines and minerals, whereas the mines and minerals were reserved in the conveyance of the other estate, and had been leased to the defendants. The plaintiffs constructed their reservoirs, some part being erected on the Taylor estate. The defendants, wishing to work the minerals adjacent to or under the plaintiffs' reservoir, gave the notice required by sect. 22 of the Waterworks Clauses Act, 1847, giving the plaintiffs the opportunity to arrest the work by paying compensation, but the plaintiffs did not avail themselves of the provisions of the Act, and the defendants continued their mining operations, and there was a subsidence of a portion of Taylor's estate, and damage to the reservoirs and works ensued. Mr. Justice —now Lord Justice—Farwell held that as the plaintiffs had not availed themselves of the provisions of the Waterworks Clauses Act, 1847, they were left without other remedy, whereas, to state the point very shortly, the Court of Appeal have held that, as owners of Taylor's land, the plaintiffs had the common law right to lateral support, independent of the statutes, a right not limited, moreover, to the 40-yds. limit prescribed by sect. 22 of the Act. This decision leaves the question still open as to what compensation, if any, can be claimed by the defendants for not working certain portions of the mines.

The Osram Lamp.

FULL details have now been published in the *Elektrotechnische Zeitschrift* of the new metallic filament lamp which is being

brought out by the German Gasglühlicht Company, of Berlin. The results of the tests of many of these lamps made by the Reichsanstalt fully bear out the statements made at the recent electrical congress at Stuttgart, and prove that a very important step has been made in the utilisation of electricity for lighting. In appearance the lamps are pactically the same as the ordinary glow lamp, but the filament is made of an alloy of osmium and wolfram instead of carbon. For this reason it is called the Osram lamp. The life of the lamp averages a thousand hours, and so is practically the same as that of the ordinary lamp. It gives the same light, however, for less than one-third the consumption of electric power. It is twice as efficient as a Nernst lamp, and, unlike the latter, it lights the moment the switch is turned on. It will be seen that if any consumer replaces his glow lamps by Osram lamps he will reduce his meter bills to less than one-third their present value. At present the lamps are only made for 110-volt circuits, but arrangements are being carried out on a large scale for making 220-volt lamps, and the German Company hope to place them on the market next month. It is interesting to notice that nearly all the most important recent improvements in glow lamps have been made in Germany, and the most obvious explanation of this seems to be that the German electrician has a much more thorough technical education, especially in physics and chemistry, than his rivals elsewhere. He more fully appreciates the importance, therefore, of having a white instead of a dead black filament for radiating light. One probable effect of the general use of metallic filament lamps will be a momentary drop in the "load" of electric supply stations, but it would be a short-sighted electrician who would regard this as a misfortune, as the greatly increased demand for the electric light would conduce enormously to the progress of the industry.

Business Methods.

WE are so accustomed to read of our trade slipping away in various parts of the would owing to the lack of energy and foresight on the part of the British trader, that it is really refreshing to read some remarks on this subject recently published by the Department of Commerce and Labour at Washington. The American "hustler" is generally held up for comparison with his out-of-date conservative British competitor, to the great disparagement of the latter; but in the official report alluded to it is actually asserted that "the manufacturers of the United States are far behind European manufacturers in enterprise, and in adapting their goods to the Eastern markets; and as a result they are making comparatively little headway in countries in which a great deal is open to them." Statistics follow proving that the European imports of the principal markets of the Eastern world are increasing at a far greater rate than those from the United States—the United Kingdom taking the lead in this advance in some of the most important of the markets named. The figures, of course, are in agreement with our own steadily-improving export returns, and call for no comment. A similar statement to this was made some years back by the leading organ of the American Agricultural Engineering industry, but a pronouncement of this nature in an elaborate report issued by a Government department is deserving of as wide publicity as that given to the strictures so frequently made upon our own traders.

THE ARCHITECTURAL ASSOCIATION ANNUAL EXCURSION.*

Wednesday, August 15.—Woodcroft Castle.

ON Wednesday morning the party took the 8.40 train on the Midland to Helpstone station, where brakes were waiting to take them to Woodcroft Castle, a moated and fortified mansion now so modernised as to have little interest remaining. It has been often illustrated, and is founded on a manor house of the period of Edward I. The space enclosed by the moat is roughly a square, of which the house occupies the west side and part of the north, being L-shaped on plan, with a round tower at the angle. The gateway is near the centre of the long or western side, and over it the house rises to three stories, forming a square tower. The house to the south of this, and possibly the north also, had originally a steep gabled roof, but this has now been replaced by carrying up the wall and putting on a square roof. Over the south arm of the moat is a small footbridge of stone of pleasing design. The interior of the house was not visited, but is understood to have been completely modernised. The house was besieged in the Civil War (1648), being held for the King by Dr. Hudson, who, when the house was taken, jumped from the round tower and tried to swim the moat, but was killed by the Parliamentarians. He is the original of Scott's Dr. Rochecliff in "Woodstock," and his story is woven into the plot of the novel.

Glinton.

From here a short drive took them to Glinton, where they made a long stop. After visiting the church the party settled down with great unanimity to sketch the manor house. The church is dedicated to St. Benedict, and is mainly of the later XIVth century, with a square Norman font. Here they were received by the clergyman, the Rev. R. C. Faithful, who explained various points, and showed them two curious old chests in the south aisle, one of which, hollowed out of a solid log, was about 8 ft. long by some 14 in. high and wide. The church is of the usual form, a nave and two aisles, with a tower and spire at the west end, and has a series of very grotesque corbels between the clearstory windows, said to represent the World, the Flesh, and the Devil, while the gargoyles outside are done with great vigour, and one at least is more curious than decent. The capitals of the nave have the top member embattled, a feature that also occurs in Market Deeping church. The spire is set directly on the tower, without turrets or other device to hide the transition from the square to the octagon, and is of great height in comparison to its width. It was damaged by lightning about 1860 and rebuilt; but by some mistake the upper part comes in much too sharply, giving the effect from below of an exaggerated entasis, which is by no means happy. In the churchyard are two recumbent figures, said to come from Northborough Church, now much defaced by weather and ill-usage.

A hundred yards away stands the manor, a charming Jacobean building, now in the occupation of Mr. Thirlby, who let the party wander all over his yard and garden. The house is an L-shape on plan, with the typical ogee curved gables of the period, terminated by stone balls with iron spikes, and is built, like almost all the buildings of this neighbourhood, of the grey stone of the district, with grey roofing slabs. The porch is the principal feature of one side, carried up all three stories, with the doorway set forward slightly in a rusticated frame, and with the window of the first floor set forward to the same face. The keystone of the porch doorway is carved, but, except for this, the simple finials and string-courses, there is little ornament. The chimneys are good examples of their type, the flues being carried up in groups of two or three, rusticated and connected by base and moulded capping, but otherwise independent. Near by is a farmhouse dependent on the manor, a plainer but still charming example, with a thatched roof instead of the usual stone slabs. Here behind the house are two fine gate piers, now much dilapidated, and leading into a cabbage garden out of a picturesque little back yard.

Peakirk Church.

From here the party drove to Peakirk, stopping by the way to lunch in a gravel pit, from which they were driven by a threat of rain, and reached the church just before a heavy thunder shower broke over the village. The place derives its name from St. Peaga, the sister of St. Guthlac, the founder of Crowland, who came here and founded a hermitage to be near her brother. The church consists of nave and aisles, but has not the usual tower and spire, this being replaced by a triple bell-cote at the west end of transitional or Early English date. The nave arcades are of the same date, the piers inclining to the Norman in style on the north side, with round arches over; the south arcade has pointed arches, and is rather later in date, while in the chancel an arch in the north side has one respond with a typical Norman capital, the other with a typical Early English one. The windows are mainly perpendicular, with the exception of three lancets in the west end, while one of the perpendicular windows in its square label has a curious development of the ball-flower ornament, this being as it were strung on a wavy stem. The south door is a fine Norman example, enclosed by a later porch, while the wooden shaft of the lectern is one of the few surviving specimens of decorated woodwork. The church is one of the smallest the party saw. The hermitage in the village, a survival of St. Peaga, was not visited owing to the rain.

Northborough.

Northborough was the next place visited, the points of interest again being the church and the manor. The church originally consisted of nave and aisles, with no tower, but later a fine chantry was built out at the east end of the south aisle to double the width of that aisle. Beneath this is a small crypt, reached by a narrow passage and stair, and filled with bones, said to be Saxon and Danish. At the east end of the south aisle are a fine piscina and sedilia, with two wide arches in the wall, said once to have contained the figures now in Glinton churchyard. The buttresses at the west end supporting the double bell-cote are said not to be bonded to the wall, and deep putlog holes exist in this wall. The chantry is the chief point of interest, containing the remains of two very fine niches, now much mutilated, parts of which were used up in the poor but pompous Elizabethan tomb of James Claypole. The roof of this chantry is carried up above the choir roof, and a passage runs all round it, carried out above the choir on corbels. The roof is vaulted in two compartments, the west vaulting shaft being divided from the aisle wall by a bit of stone screen, said to come from Peterborough Cathedral. In the chancel is a portrait of "Lady" Elizabeth Claypole, Cromwell's daughter; his wife was also buried here, and tradition says that the burial at Westminster was false, and the body of the Lord Protector himself lies in the churchyard. The Rev. S. G. Short met the party and showed them over the church.

Northborough Castle.

From the church they strolled across to the manor, known as Northborough Castle, once in the possession of the Claypoles, and considerably larger. The castle at present consists mainly of the hall and gatehouse opposite; the latter has lost its upper story, which is replaced by a hayloft, while at one side a range of stabling was built on in Charles I.'s reign, attributed by local tradition to Oliver Cromwell. The gatehouse has a fine double arch, with a third arch set at a slight angle in front, parallel with the road; the space left between this and the gateway proper was once vaulted in stone, though only the springing of the shafts remain. The gateway has a large arch for

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* Continued from last week. See page 226.

carriages and a smaller for foot passengers, with a stone bench beside it. On one of the gables of the stabling is a quaint sundial by way of finial.

The hall was parallel to the gatehouse, though the "screens" entrance was not quite opposite. The interior has been completely gutted, and no trace remains of the screen, unless a great oak beam in the ceiling be part of it. The entrances at each end remain, and three very fine decorated doorways, once leading to the buttery and kitchen, though these again have been modernised. The gable coping at this end of the hall is crocketed very boldly, and terminates in a fine carved chimney, illustrated in Parker and other text-books. The window heads were once filled with flowing tracery, recalling the well-known Venetian type, but these are now bricked up, making a square termination to the two lights, and on the south side later gables have been carried up, making a very pleasing combination. There is no trace of the usual bay window, and the hall seems short in proportion; it may possibly have lost a bay in subsequent alterations. In the later rooms over the site of the kitchens there is some butt-moulded panelling used as partitions, and a good fireplace; the plastering of the ceilings is carried on reeds instead of laths, and the floors in several of the rooms are formed of plaster or cement instead of boards.

Market Deeping.

A heavy thunder shower somewhat delayed the start for Market Deeping, where the party were most hospitably received by the rector, the Dean of Stamford, who gave them tea in his garden (interrupted by a second shower), and showed them over the remarkable rectory and the church. The rectory embodies the remains of a pre-Reformation parsonage, consisting mainly of the hall and dormitory over, now cut up into smaller rooms. The timber roof is very fine, with later figures of angels and monks attached to the principals, and the upper rafters can be well seen from the dormitory, which is reached by an extremely ingenious, if not quite satisfactory, stair. The original doors to the hall remain in position, with their hinges, and form fine specimens of XIVth century ironwork; there is also a good XIVth century window. The house has been illustrated in Parker's "Domestic Architecture" and in Cutts's "Life of a Parish Priest in the Middle Ages." The rectory and church stand on the King's-road, perhaps a Roman road, and certainly of great antiquity, which is mentioned several times by Kingsley in "Hereward the Wake." The church, beside the rectory, is dedicated to St. Guthlac, the founder of Crowland, and is mainly XIIIth century work, the south door having the original door and hinges of Early English work. The north arcade of the nave has round arches on peculiar capitals, which look as if they had only been blocked out, not carved, and on the springing over the first pier from the chancel is a little niche. The south arcade is pointed, on more usual capitals. The church was restored in 1877, and the north aisle carried westwards alongside the tower, to correspond with the south aisle, and the vestry and organ chamber added. The chancel has a pair of mutilated niches in the eastern angles, a piscina, and pair of sedilia, with another niche beside them to the west, larger, and carried down to the ground. These are figured in "Churches of the Nene Valley," though Market Deeping is on the Welland. There is also a XIVth century tomb slab in the chancel, and a pair of old bench ends made up into a chair. The church owns a fine pewter flagon bearing the date 1774, though perhaps earlier, and a silver chalice of good plain design of about 1640. The roof is a flat pitched timber one, and there is a piscina in the north pier of the chancel arch. The square tower contains a peal of bells, rung every night at six o'clock for curfew. In the churchyard are several stone coffin-lids of the XIth to XIIIth century, but these are for the most part mutilated.

A momentary halt at Uffington on the road to Stamford gave a delightful glimpse, through lofty iron gates above a semi-circular stair, of a formal garden belonging to Lord Lindsay, whose house here was damaged by fire about a year ago. The church has good ironwork to the gate; the nave is transitional Norman work, but the chancel and the corbels in the nave, with a peculiar niche or canopy over the pulpit, are modern. Under an arch in the chancel lies the stone figure of a knight in armour that presents several peculiarities, but light and time did not permit a close investigation. Opposite is a Jacobean or Elizabethan monument, with two kneeling figures. The spire is a fine example, with crocketed angles. The party returned to Stamford along the Welland valley, passing St. Leonard's Priory, a fine late Norman building, now used as a cart-shed.

Thursday, August 16.

The programme this day consisted of Lyddington and Rockingham, and an early start by train was necessary. Passing Ketton and its quarries, we came to Rockingham Station, where the brakes awaited us, and drove to Lyddington, a picturesque village, where the prevailing ironstone made a pleasant change after the grey of Stamford. The church, a fine Perpendicular example, is flanked on one side by the beautiful "Bedehouse," once a palace of the Bishops of Lincoln, the garden of which runs down to the main road, and has a curious octagonal tower at the angle, known locally as the "watch tower." The garden is higher than the road, so that, though there is a footway through an arch below, one enters on a level from the garden. Inside there are remains of four windows, three of which are now built up, and three cupboards in the remaining sides, with remains of iron hinges. At one time there are said to have been three other similar towers. Their use is unknown, perhaps garden houses or gazebos; the country people say they were built to watch for Oliver Cromwell, though obviously the only remaining specimen is Perpendicular work. The church has a fine lofty tower, with a curious stumpy spire, in marked contrast with the height of most of those in the neighbourhood. There is a good reticulated east window, and traces of a north and south door in the aisles; the south door had a porch over it. The present entrance is by the west door under the tower. The vestry also shows signs of having once been some 4 ft. higher. Internally the church suffers from the loss of its stained glass, some scraps of which still remain. There are considerable traces of colour decoration over the chancel arch and on each half-bay westwards, while the modern chancel screen has a series of old Perpendicular panels in its lower part, carved and showing remains of colour. The communion table is placed completely clear of the east wall, with the rail running right round it, an arrangement that may also be seen at the Saxon church of Deerhurst, near Gloucester. In the chancel are two brasses, one showing a very graceful figure of a lady, the other to a member of the Watson family, of Rockingham. The font is square and early, with a wooden cover that does not fit it, and is hardly in keeping. A remarkable series of stone coffin lids has just been discovered, hidden under the churchyard hedge, and forming the coping of the wall.

The glory of Lyddington, however, is the Bedehouse, a splendid Perpendicular house of the Bishops of Lincoln, now belonging to Lord Exeter. Running roughly east and west, there is a covered passage on the north side, forming a sort of cloister. The stairs are north of this again, and come over to the house at the first-floor level; on the ground floor is a most picturesque kitchen, with a wide hearth spanned by a carved and moulded arch. Opposite the stair head are two fine doorways in stone, the right-hand one leading to a long room, the hall, with a splendid panelled oak ceiling, having a fine canopied cornice, probably once coloured. Halfway down the south side is a bay window, and opposite a stone fireplace, with a wide flue, in which are iron holdfasts, and a dark opening in one side. No one, however, was found bold enough to brave the soot and find out whether this led to a priest's hiding place or to a more prosaic curing chamber. Leading out of the long room is a smaller room with a similar ceiling, both rooms having small internal porches of later date. The glass in these rooms is fairly complete, and of the period, and bears the mottoes "Delectare in Dño" and "Dñs delectacio mea," with roses and coats of arms. In the bay is the red rose of Lancaster, a most splendid piece of colour. The floor is of cement, and, though it has sagged in places, is still in fair condition. The smaller room has another good fireplace. In the bay of the long room is an old oak chest, and near the door a money-box to hold the fines of those who were late for dinner.

Rockingham Castle.

After luncheon the party drove back past the station, over a mile of flat, straight road in the valley, to where the town of Rockingham straggles in a long street up the steep hill on which the castle stands. In the village is a modern cross on an ancient base, and near the top of the street a gate leads into the park, and the road winds round the gully, which once protected a side of the castle to the gate, flanked by two low round towers. Little remains of the original wall of the castle, though the line of the outer defences, of considerable extent, can be traced by mounds in the garden, and the site of the keep, now terraced and bright with flowers, is fairly clear. The castle stood on a promontory of the escarpment of the valley, flanked by two steep-sided gulleys. The side overlooking the valley and the town is also very steep, and has been carved into terraces some 10 or 15 ft. high at the foot of the wall, to make it still more unpleasant for any attacking force. There was no moat, as the situation made this impossible. The gate is flanked on one side by a charming guesthouse; on the other, the left as one enters, is the long range of the house, with the main door, which Mr. Green has sketched, and opposite a return wing, nearly enclosing the forecourt. The other side of this wing, which runs back a long distance, masking the kitchens and offices, and extending nearly to the keep mound, faces first a large lawn, bounded on two sides by the line of the walls, and on the other by a fine pair of yew hedges, clipped into curious shapes. Above this, on a slight terrace, still fronted on one side by the long low line of the house, with its irregular gables, is a fine garden laid out with turf walks and formal flower beds, and a sundial in the centre. Beyond the house rises the keep mound, now laid out in flowers, from which there is a delightful glimpse of a picturesque kitchen court behind the main buildings. Beyond the mound are more formal gardens, merging gradually in lawns and trees, till the wilder parts of the park are reached. Some distance from the house, just beyond a ridge which marks one of the lines of defence, is the kitchen gardens, two brick-walled squares bordered with flowers, and flanked on one side by the gardeners' cottages. The house itself in its charming setting is very picturesque, though with no pretence to the elaborate stateliness of Kirby or Apethorpe, while the inside has been entirely modernised. Mr. W. A. Watson, the owner, in whose family the house has been for generations, received the party most kindly, providing tea in the dining-room, the floor of which, like all the other rooms in the long wing, is sunk a foot or two below the ground, probably as a defensive precaution, and afterwards showing them over the house. In the hall are various curiosities, amongst them one of King John's treasure chests and some good furniture. The dining-room is a charming panelled room, with a high window at the end. The drawing-room is upstairs, and contains some good pictures, a Vandyck, a Reynolds, and a particularly charming portrait by Lely of the first Lady Rockingham. From the castle the party returned on foot through the village to the station, admiring the huge railway viaduct across the valley.

Friday, August 17.—*Harringworth.*

For this, the last day of excursions to the neighbourhood, the secretaries had reserved perhaps the climax of the whole excursion, Kirby Hall, but the day was a little spoilt by threats of rain, which were unhappily fulfilled in the afternoon by several showers. The party set out by rail to Seaton, on the way to Rockingham, close to the huge viaduct mentioned above, and from there took brakes to Harringworth, a picturesque village about a mile away. Here a stop was made to examine the church and village. The former is in the main a Perpendicular church of the usual type, with nave, north and south aisles, and

chancel, but the tower and spire are earlier, the tower having a Norman arch carried on capitals showing the "inverted volute." The south porch is also earlier work, while the mouldings of the north door die on to a most unusual series of steep conical weatherings. The windows to the clearstory are square-headed; there are three sedilia, an aumbry, and piscina in the south aisle, and sedilia and piscina in the chancel, now much mutilated. A curious little stair in the south chancel arch with two light holes, which can hardly be called windows, leads up to the rood loft, a modern restoration; but the screen below is genuine Perpendicular work. At the west end of the north aisle is the vestry, separated from the church by a Jacobean screen of fine, simple work, and at the other end a curious erection, some 5 ft. high, and crowned with poor ironwork, blocks all the aisle, and contains the family vault of the Tryons. Several bits of Jacobean and earlier panelling lie about the church. There is a good Early English font, and the buttresses of the east end are crowned by a pair of grotesque monsters. In the village is a graceful cross, the subject of one of Mr. Green's sketches, near which is a cottage with an elaborate decorated chimney as finial to its gable. The Swan Inn has a XVIth century front and a very picturesque backyard, while between it and the church is a good plain house with clipped yew trees in front. From here the party began to climb the escarpment of the Welland valley, farther along which lies Rockingham, till we came to the village of Gretton, in a commanding position overlooking the valley.

Gretton.

Here, as at Lyddington on Thursday, the party got into a country where ironstone is to some extent used in place of the grey, making a very pleasant variety. The church is perhaps more curious than beautiful; it is mainly Perpendicular, but has an earlier tower and no spire. The nave arcade is curious; of the four arches the two middle ones are Norman, the others being Early English, that to the west very narrow and the eastern one very wide. The passage between the pews widens out with a sweep when it comes to this arch, giving a very good effect. The two aisles have rudimentary transepts at their eastern end, and at the south-eastern angle of the south aisle, against the chancel arch pier, are built in two arches of a very rich Early English arcade with the dog-tooth ornament. The windows to the choir are square-headed, and the choir itself panelled in poor XVIIIth century work. The east window is most unfortunate, being at least a foot narrower at the base than at the springing of the arch, the mullions more or less sloping outwards accordingly. The pulpit is a good plain example, and there is a fine Jacobean balustrade shutting off the vestry in the tower. The church has been restored by Mr. Talbot Brown, and has a timber roof of flat pitch. In the churchyard is a very rude and primitive cross, standing only 2 or 3 ft. high. Opposite the churchyard is the village green, a triangular patch, on which stand the stocks and whipping-post, in very fair preservation, an object of great interest to the party. The village boasts some good XVIth century houses, with the typical chimneys of the district, and the occasional use of ironstone gives a touch of colour. The village inn has some elaborate ironwork supporting the sign.

Kirby Hall.

From Gretton the party drove on to Kirby Hall, the most magnificent building they were to see, and also the most desolate. This huge house, designed by Thorp in 1572, and altered by Inigo Jones, is at present inhabited by a caretaker, who occupies one corner. The rest is roofless and ruined, the drives grown up with grass and vanished, the gardens gone back to meadow. So much has been written about Kirby, it has been so often drawn and measured, that a fresh description would be as superfluous as it is impossible. Suffice it to say that the party found ample scope for their energies. Details were sketched and measured; a few of the boldest settled down to attack the great hall, with its elaborate semi-hexagonal ceiling, and gallery by Inigo Jones; some made distant views of the exterior, and some tried to reconstruct the gardens, or speculated on the possibility of again putting the house into repair. Mr. Green's smaller sketch shows the garden front; the nearer angle is all that is inhabited. The further of the two great bay windows marks the room, once the library, now used as a dining-room for trippers, who write and scratch their names on all the walls. One curious point in the masonry is that the angle quoins and the window jambs, though dressed off to look regular, in reality in many cases extend further back into the rubble masonry of the walls, the superfluous stone being carved to imitate the surrounding rubble. There was some difference of opinion among the older members, some saying that the building was in far worse condition than it had been on previous visits, others that the decay was not so noticeable. It is some consolation to think that the Jews who sold the lead off the roof, and so caused all this ruin, by a fortunate accident never got their money, for the plumber to whom it was sold went bankrupt immediately after removing it. Inigo Jones's work is practically confined to the entrance court and front, to a window over the porch in the inner court, and to the great gallery in the hall. The name of Humphrey Stafford, the original owner, occurs on the parapet of the great hall, and his device and crests occur everywhere in the enrichments of Thorp's work. At the time of Napoleon's threatened invasion the house was selected as a place of refuge for the Royal Family, should London become untenable.

From Kirby the party drove back in a heavy rainstorm to Seaton Station, and so returned to Stamford and the usual festivities of the last evening.

Saturday, August 18.

Saturday morning saw a considerably diminished party, as several members had to leave on Friday night, and others by early morning trains. Of the rest about a dozen accepted the invitation of a local quarry owner to see his brickworks and quarry. The stone is found under a thick bed of clay, from 15 to 20 ft. deep, but this can be utilised at the brickworks, which turns out chiefly fire-brick and adamantine clinker. The machinery seemed of the most up-to-date description, and is capable of turning out about 10,000 bricks a day. Close by, over the crest of the hill, is the quarry, producing Casterton stone, resembling Ketton, but rather coarser. Last year, on the top of the stone, in a gully in the clay some 18 ft. from the surface, was found the skull and other remains of a neolithic man, together with a very fine polished green stone celt, and above, some fragments of later pottery, apparently washed down the same cleft in the clay. Near by was found the skeleton of a horse, whether neolithic also or not we cannot say. In the clay pit we were shown the fossilised trunk of a tree, strongly impregnated with iron from the surrounding soil.

This party rejoined the others at half-past ten to see over Burghley House, the home of Lord Exeter, the lodge gates of which stand just outside the town on the London road. These gates were built at the beginning of the last century, and are imposing enough. On each side is a little lodge, carried up two storeys, and ending in an octagonal dome, the finial of which forms the chimney. The house is about a mile further on, with no formal avenue, and is an extremely florid example of Elizabethan architecture, built in the form of a square round a courtyard, with extensions on one side towards the stables. Two of the other sides look on to the gardens, while the fourth side faces the forecourt, enclosed in a very graceful iron screen. But the most striking feature of the house is the inner court, with a wonderful clock tower crowned by a pyramid, on each side of which the lions of the Exeter crest ramp up as supporters. A very good effect is given by the later corridor built on round this court for two stories, the third story, with its very open balustrade, being left at its original face behind the others.

The interior of Burghley is too complicated to be described here at any length. The hall has marble capitals and bases to the columns of a very pleasant creamy tint. The upper floor is reached by a fine stone staircase, with intricate patterns and pendants to the stone vaulting, and consists of a great series of State rooms, with ceilings painted by Verrio, tapestried or panelled walls, with carvings by Grinling Gibbons, hung with numberless pictures, many of them poor enough, but others of the highest beauty and interest. Among these are some Vandycks, a portrait of the great Lord Burleigh, of Queen Elizabeth and her father and sister. The rooms also contain a splendid collection of china and glass, and many very fine steel grates and fenders. They lead at last to the great staircase, with the largest of all the Verrio ceilings, off which opens the great hall, one of the first parts of the house completed. This is very lofty and has a good open timber roof, with an immense window beside the dais, and a huge fireplace. The kitchen is a large groined and vaulted chamber, and in the yard outside is a very attractive little cloister, enclosing a curious building, ornamented with what appear to be representations of beer barrels. The chimneys are noteworthy, in the form of Tuscan columns with connecting entablatures.

The afternoon, for such as remained, was devoted to Stamford itself. The six churches, each with points of interest, and the numberless fine houses, made up a full afternoon; indeed, it would take a week to do anything like justice to the town. There are three almshouses in the town, a modern one in Scotgate, one beside the bridge, with a delightful range of chimneys and dormers, and Browne's Hospital, a most picturesque building in the upper part of the town. This has been largely modernised, but once resembled St. Mary's Hospital at Chichester, in that the cubicles of the bedesmere opened into the chapel. There is some fine stained glass in the chapel, and a good Jacobean table in the antechapel. Of the churches All Saints makes a splendid group, the building mainly Perpendicular, but with an Early English arcade running round most of the outside. It has also perhaps the most satisfactory spire in the town, though St. Mary's, which is also very fortunate in its position, runs it very close in this. St. Mary's also has a fine modern screen by J. D. Sedding, and a good painted roof to the chancel. St. Martin's, across the river, contains the monument of the great Lord Burleigh, a splendid piece of Elizabethan work, and of his descendants of the Exeter line. There is also much good glass in this church, and in the churchyard is buried Daniel Lambert, of prodigious memory. Archbishop Laud was vicar of this church for a couple of years. St. George's is a queer little church, with an oblong tower, and in St. George's-square, surrounding it, may be seen good examples of the typical XVIIth and XVIIIth century houses for which Stamford is famous. Others may be seen in Barn Hill, behind All Saints Church, and, indeed, in every street. The prevalence of round bay windows of small projection is very noticeable; generally only on the ground floor, they are sometimes carried up two or three stories. A very good shop front near St. Mary's has a pair of them, the door between standing in a slightly projecting bay, with a very slight recessing. The effect of this reversed curve between the two projecting ones is very happy. But so much has been written lately about Stamford, and so many drawings and photographs been published, that its principal features must be known to all architects, and to go through them again would be tedious.

During the afternoon all the remaining members of the party left, some for London, some staying over Sunday at Peterborough, and others for various destinations. So ended the thirty-seventh excursion, for the success of which full credit must be given to Messrs. Hennings and Talbot Brown, the indefatigable honorary secretaries.

CARMYLE U. F. CHURCH, GLASGOW.—The memorial stone of Carmyle United Free Church was laid on Saturday last week. The new church is in the Gothic style, and occupies a site adjacent to the present temporary place of worship. When completed it will have accommodation for 400 people in the area and sixty in the gallery. A deep recess has been formed behind the pulpit for the reception of an organ at some future date. A session-house, vestry, and ladies' room are to be provided at the rear. The entrance door faces the main street. The buildings were designed by Mr. Petrie, architect, and the contractors were:—Mr. William M'Gaw, mason; Mr. George Eaglesham, joiner; Messrs. A. & D. Mackay, slaters; Mr. Robert Gardiner, plumber; Messrs. John Struthers & Son, plasterers; Messrs. Knox Bros., glaziers; Mr. George Smart, clerk of works.

ISOLATION IN FEVER HOSPITALS.*

I HAVE ventured to bring before your notice particulars of a new departure which is being made by the managers of the Metropolitan Asylums Board in connexion with the numerous infectious hospitals under their control. This new departure relates to the isolation of patients suffering from, or suspected to be suffering from, scarlet fever, diphtheria, or some other infective disorder. . . .

The principle thus recommended [in reports by Professor Simpson and Dr. Cameron] is, in fact, that of treating every incoming scarlet fever or diphtheria patient as "doubtful," and consequently to isolate such patient for a period long enough to exceed the period of incubation of any other or "secondary" infectious disease, such as measles, which the patient may have contracted before entering the hospital. Now there are several good reasons for adopting this principle. Hitherto the usual practice has been to receive patients direct into general wards containing from eight to twenty-four beds, according to the construction or size of the hospital, cases of obvious concurrent infections, or obviously wrong diagnosis, being placed in isolation wards, having one, two, four, or six beds in a ward, and being in separate buildings called isolation blocks or pavilions.

But although these "obvious" cases are immediately isolated, there must of necessity be a large number of "doubtful" cases sent to fever hospitals, of both scarlet fever and diphtheria, owing to error in diagnosis, and it is a well-known fact that the proportion of these errors in diagnosis is increasing rather than diminishing, and that many of these cases find their way into the general wards.

There are also the cases, already referred to, of patients admitted suffering clearly from scarlet fever or diphtheria, which ultimately develop another infectious disease after having been some time in the general ward, the patient having contracted this disease also before admission to the hospital, but the disease not having developed at the time of admission.

We come, therefore, to this conclusion, that, as it is quite impossible, in receiving a case, to decide that it does not contain the germs of another but undeveloped infectious disease, and that such cases are numerous and frequently cause much mischief, and that as much trouble also arises from errors in diagnosis, the only safe course is to treat every incoming case as "doubtful," and to administer the hospital accordingly.

This means, therefore, that every incoming scarlet fever or diphtheria patient must be isolated for a period varying from a fortnight to three weeks, to be afterwards transferred either to the general wards or to a convalescent hospital; and the question now arises, what shall be the nature of the isolation? Shall the patient be isolated in a separate room, *i.e.*, a room entirely closed in, with walls or partitions reaching closely from floor to ceiling, or will the isolation afforded by cubicles, *i.e.*, rooms or spaces enclosed by partitions about 7 ft. high, be sufficient for our purposes? . . .

At the Infectious Hospital of the Walthamstow Urban District Council at Chingford there has recently been opened a special isolation pavilion for twelve beds, the plans of which are before you. These, again, are isolated rooms, each room containing 2,000 cubic feet, the partitions reaching closely from floor to ceiling. They are in two groups of six, placed back to back, with the nurse's duty room so placed between each group that every one of the twelve rooms can be easily seen into from two observation windows. All the partitions are glazed with plate glass in very large squares, the sight-line of the glass being only 26 in. above the floor, so that patients lying in bed can see each other, and also be easily observed by the nurse. Although the rooms are placed back to back, cross ventilation has been secured by fresh-air ducts under the floor. Each room is entered directly from the open air under a glass verandah.

The Ward "Henri Roger" in the Hospital for Sick Children, Paris, 98 ft. by 23 ft., and 14 ft. 9 in. high, formerly a general ward for the treatment of non-infectious diseases, has been adapted for the isolation of doubtful cases, and divided into twenty cubicles, ten on each side of a central passage, each cubicle having a large window. The cubicle partitions are 6 ft. 10½ in. high and glazed, and each cubicle has a glazed door. There is a space of 2 in. between the floor and the bottom of the partition, the object being the free circulation of air.

One of the wards in the Hospital for Sick Children at Paris has been fitted up with "partial cubicles," *i.e.*, dividing partitions (glazed), but with no inclosure in front, and consequently no door. These partitions also stand a little clear of the floor. As to the absence of the partition in front of the cubicle, Professor Grancher, who speaks from experience, in advocating such an arrangement, says: "If the nurse is aseptic a door is not required; if the nurse is not aseptic the door will not prevent the entrance of infection."

I will now describe the special isolation arrangements about to be carried out at the fever hospitals of the Metropolitan Asylums Board, premising that we are at present in the experimental stage, and that we shall commence with one or two hospitals only, although the managers have decided that the principle, as exemplified by the plans already prepared, shall eventually be applied to all the hospitals.

It has been decided, after consultation with the medical superintendents of the Board's hospitals, that the cubicle system of isolation of incoming patients is the most suitable, and one likely to prove the most effective in preventing the introduction and spread of secondary infection, and of preventing the trouble arising from errors of diagnosis.

It is considered that the risk of aerial conveyance of infection from one patient to another in a well-ventilated ward, divided up into cubicles, is so slight as to be almost a negligible quantity, in the case of mild attacks, which constitute so large a proportion of doubtful cases, and that it is now generally believed that the infective element in scarlet fever and diphtheria is conveyed almost exclusively by personal contact and not by the air. Therefore one bed isolation rooms, completely enclosed from floor to ceiling, should be unnecessary, as well as undesirable and costly. On the other hand, the partial cubicle, *i.e.*, the cubicle with the open front, could hardly guarantee that separation of one patient from another which is essential to prevent infection by personal contact. This is especially the case as regards children suffering from scarlet fever (by far the most numerous class in our hospitals), as, the present type of this disease being so mild, the children usually leave their beds at a comparatively early stage, and must therefore be kept within a confined area such as is provided by the cubicle.

The cubicle system, pure and simple, has many advantages. It is economical as regards first cost, it is easily adaptable to an existing ward, and it affords ample facilities for good cross ventilation. As regards the latter, if the ward in which the cubicles are to be placed is already well ventilated, there will be nothing in the cubicles to materially injure that ventilation. This question of adaptability of existing wards for cubicle purposes is a very important one, as it is obviously in the existing wards of fever hospitals where these new arrangements would first be adopted.

I will now draw your attention to the plans of cubicles to be provided in two of the Board's hospitals, the first in order of time being at the South-Western Hospital, Stockwell, to be followed by similar cubicles at the South-Eastern Hospital, New Cross. There is this difference, however, that, whereas the wards at the former hospital are thirty-five years old, those at the latter have only just been completed. The details of the cubicles and of the arrangements for insuring asepsis are, however, practically the same in both cases.

To deal first with the cubicles at the South-Western Hospital: these are arranged on each side of two existing wards, having a corridor in the centre. The central fireplaces and chimney-stacks have presented a difficulty which has been got over in the manner shown. In most existing wards there will, obviously, be some difficulty or the other to be surmounted. The ward is 100 ft. long, 28 ft. wide, and 14 ft. 6 in. high. The ward originally contained eighteen beds, and as there will be sixteen cubicles, there will be loss of two beds, or 11 per cent. As a rule the loss of beds under the new arrangements will work out at about 15 per cent.

Each cubicle will have a floor area of about 120 ft. The partitions are 7 ft. high, and go close down to the floor. The raising of these partitions a few inches clear of the floor for the purposes of air circulation has this serious disadvantage, that children (who are the majority of patients) might pass articles to each other through this space. The partitions are of 2 in. steel framing, the lower portion filled in with asbestic panels, the upper portion, commencing about 2 ft. from the floor, being glazed with 32oz. sheet glass. Plate glass would be preferable, but we wish to be very economical. The partitions will stand upon hard wood fillets, rounded on both edges so as to avoid a bad angle against the floor. The finish against the walls will be similar. The cubicle partitions are therefore absolutely fire-resisting, a matter of vital importance where patients are individually isolated.

The doors will be dwarf doors, 3 ft. 2 in. high, sufficiently high to prevent a child from getting out of the cubicle, and low enough to admit of a free current of air. Gilmour doors will be used, which, being of hard wood, are practically fire resisting. The doors are so placed that the door of one cubicle is not opposite that of another cubicle. Each cubicle has one large ward window with double-hung sashes, and hopper sash over. As the floors of these wards are of deal, thirty-five years old, we are replacing them with teak floors.

There are hot water heating pipes running round the wards, which will be sufficient to warm the cubicles, while the corridor and the general air space above all will be warmed (in addition) by the central fireplaces, which will also act as exhaust ventilators. There are fresh air inlets in the external wall of each cubicle. There will be ample cross ventilation by means of the windows. This is an illustration of how the existing warming and ventilation of a large ward lend themselves naturally to the cubicle arrangement.

The arrangements for ensuring a condition of perfect asepsis on the part of the doctor and nurse will be upon the same lines as those at the Pasteur Hospital. An overall hanging in the cubicle will be put on upon entering and removed on leaving, when the hands will be washed in a lavatory basin to be afterwards described. All instruments used in the cubicle will be sterilised in an apparatus in the sanitary turret, and all food utensils coming from the cubicle will be sterilised in the ward kitchen after each meal.

As regards the lavatory in the cubicle, which will be used for washing the hands of anyone entering, we propose an arrangement somewhat different from that at the Pasteur Hospital or the Walthamstow Hospital. At these institutions the basin has a plug and chain, and hot and cold water taps. Thus two things occur which we desire to avoid: Firstly, the basin can be filled with water, in which the hands are washed, the basin thus being made septic. Secondly, the nurse has to touch the taps in order to obtain the water, and to touch the chain of the plug, which is in the dirty or septic water, in order to empty the basin. We wish to do away with all this, and for this purpose we provide a basin, standing on brackets, and quite 3 in. or 4 in. clear of wall and partition, which, while having a waste pipe, has no plug, and cannot therefore be filled. Instead of hot and cold water taps which must be handled in order to be used, we provide a pedal action spray to discharge tepid water at a convenient height over the centre of the basin. The nurse can thus wash and rinse her hands in a running spray of perfectly and continuously clean water. The basin has also a flushing rim, so that it cleanses itself each time it is used. Hot and cold water are laid on to a mixing valve, set to produce a tepid temperature, and fitted with a thermometer, there being one mixing valve to each range of four or six basins.

* Part of a paper by Mr. T. W. Aldwinckle, read before the recent Royal Sanitary Institute Congress at Bristol.

In this connexion it should be mentioned that the relative positions of the bed, door, and lavatory should be such that the nurse should not have occasion to go near the bed in passing from the lavatory to the door on leaving the cubicle. As the patients in these cubicles will be mostly in the acute stage of the disease, bed-pans will be mostly in use. One w.c. is, therefore, sufficient for the sixteen cubicles. There are also provided a bed-pan sink, a scalding sink, and a portable bath. For the same reason as last mentioned, few arrangements will be necessary for airing the patients. Such few cases as might be suitable will be taken one at a time into the airing yards, in charge of a nurse. At the Pasteur Hospital balcony verandahs are arranged for the isolated rooms, but I understand that they are seldom used, except for cases of plague, when special isolation is observed by entering the bedroom from the balcony instead of from the central corridor. We originally arranged balcony verandahs in connection with the cubicles at the South-Western Hospital, but these have been abandoned, as it was considered that the greatly increased cost would not be justified by any equivalent advantages.

At the South-Eastern Hospital, generally speaking, the arrangements are similar to those at the South-Western Hospital, except that we are not troubled with central fireplaces, and thus obtain cubicles of more uniform size and shape. Here the cubicles have a floor area of 141 ft. Each ward, which as a general ward contained twenty-four beds, will take twenty cubicles, or a loss of four beds or 16 per cent.

The warming and ventilation of these new wards are carried out without fireplaces. The cold fresh air is brought in through the external walls at the floor level, and is warmed by passing over and through radiators inclosed in cases. The vitiated air is removed at the ceiling level by fans capable of removing 5,000 cubic feet per bed per hour, thus also producing a strong intake of fresh air through the radiators and cases. This arrangement, as intended for a general ward, fits in exactly for the cubicles, as there are a window and radiator and case in each cubicle.

I need scarcely point out to you that all these structural arrangements will be valueless unless there is the most careful attention on the part of all who have to do with the patients as to technique of asepsis. No detail of this character can be too insignificant to be neglected. Also that the general cleanliness of the walls, partitions, and floors should have constant attention, and that dust, a most dangerous item in an infectious hospital ward, must never accumulate. For this purpose the floors should be of terazzo, or of teak, or some other hard wood capable of being readily cleansed by damp cloths, and that the walls and partitions should be covered with a hard enamelled paint to afford the same facility for cleansing, thus avoiding what is called "dusting." I have heard careless dusting described by a high medical authority as "a stirring up of sleeping dogs."

The question of cost is a very important one, as if this principle is to be generally adopted a large number of cubicles will be required. It is estimated that the cost, including the spray lavatory, will not exceed 50*l.* per cubicle. This is assuming that the ward in which the cubicles are to be placed is in a fair state of repair.

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* DUNDEE ARCHITECTS AND FREE LIBRARY PLANS.—A deputation of Dundee architects intend to wait upon the Town Council at their next meeting, with regard to the plans of the two branch libraries to be built in the north and west ends. Hitherto the City Architect (Mr. James Thomson), who now combines the duties of city architect and burgh engineer, has drawn the plans without any extra fee; but at a meeting of local architects the opinion was expressed that on æsthetic grounds, and having regard to the special requirements of library construction, competitive plans open to the architectural profession should be called for. If that step were taken, the meeting suggested that an outstanding member of the profession should be appointed judge. It is further stated that such a course would have the approval of Mr. Andrew Carnegie, the donor of the libraries. —*Scotsman.*

LIGHT IN DARK ROOMS.*

LIGHT is necessary to health; and yet there is no definite provision in the Public Health Acts for ensuring that dwelling and work rooms are properly lighted. The provisions for underground rooms separately occupied require a window of a certain size, and doubtless the Acts had in view daylight as well as ventilation, but light is not mentioned in the Public Health Act or in the Public Health (London) Act. The only way in which dark rooms can be dealt with is by declaring them to be in such a condition as to be a nuisance or injurious to health. The Borough Council of Woolwich has enforced this section, and obtained a conviction in a case where a room was proved to be dark, this being the only nuisance complained of. The room was a front basement, but not separately occupied or used for sleeping; it was lighted by a window looking into a small area, having over it a grating through which alone light could be obtained, and it was proved on the hearing that large print could not be read in the middle of the room on a clear day an hour before sunset. The Medical Officers of Health of Greenwich and of Woolwich gave evidence both as to the fact of the room being dark and as to their opinion that light was essential to health. In other respects the condition of the room was satisfactory. For the defence it was shown that the actual tenants had occupied the room for over twenty years and were still alive. An order was made to abate the nuisance with 23*s.* costs.

In this case additional light was provided by increasing the width and height of the window and the width of the area, and replacing the area-grating with one in which the bars were set at right angles to the front of the house instead of parallel.

The principal causes of darkness are:—(1) Insufficient size of windows; (2) windows being wrongly placed, *e.g.* in a corner; (3) room underground with area of insufficient width or covered over; (4) street too narrow to give a sufficient angle of light; (5) existence of back additions; (6) trees obstructing the light.

One very simple and common mode of obtaining light is the use of whitewash for the surface of areas, adjoining and opposite walls, and interior surfaces. The whitewash needs renewing at least once a year. For areas whitewashing is a very temporary expedient; coating with glazed bricks is far preferable and often of great utility, if the area is sloped at the right angle.

One of the simplest and cheapest means of improving light is the use of certain kinds of glass which are highly refractive, such as Muranese, and, better still, prismatic glass. Muranese glass has a raised pattern, and prismatic glass is fluted in straight lines; both have one plain surface. The plain surface should be outside and the ribs of fluted glass horizontal. This kind of glass has the double advantage of refracting the light so that it does not all fall on the floor near the window, and of making curtains and blinds unnecessary for purposes of privacy. The used of such glass for increasing the light of offices and workshops is well known, but it is not likely to be used for dark living-rooms, unless at the instance of the sanitary authority.

When a forecourt exists it has been found possible in some cases to increase the light of basements by sloping off the area at a larger angle and tiling its surface. When there is no forecourt and the area is necessarily covered with a grating the nature of the grating is of prime importance. The bars should be narrow but deep, and they should be set at right angles to the surface of the house wall, and not parallel, as usually found.

But in many dark basements very little light can be obtained unless the window can be raised in height. In most windows the larger part of the light enters near the top, and this is especially the case in underground rooms. Often the height of the window cannot be raised without encroaching on the floor of the room above. In three cases in Woolwich this difficulty has been overcome by cutting away the rafters, fixing a trimmer, and constructing a bulk-head in the room above. The result was very satisfactory in each case. In other houses when the height of the basement-room was under 7 ft. the floor has been lowered 12 in. or 18 in., and this has increased the lighting of the floor and furniture, where light is most needed.

In certain cases, where a basement has consisted of an underground room in front and a room above ground-level behind, the party-wall between the two rooms has been removed for the greater part, and the two rooms thrown into one. Light has thus been allowed to enter from the opposite side, and a large, fairly well-lit room obtained.

In cases, however, where it was attempted to gain additional light for a dark room by constructing a glazed window in the upper part of the party-wall the result has been unsatisfactory, as might have been foreseen.

For the window to lighten the room to the greatest advantage it needs to reach to the top of the room, and to be placed nearly in the middle of the wall. In one case a room with a good-sized window was badly lighted owing to there being a high wall a few feet off, which almost wholly prevented direct rays of light entering the room. But the window did not reach to within 18 in. of the ceiling, and by raising it 12 in. rays of light were enabled to enter direct from the sky, and the light of the room was doubled. In other cases rooms have been dark owing to the window being in a corner or at one side of the wall; in such cases a small additional window has been constructed.

Where trees appertaining to the house obstruct the light, the remedy is obvious; if, however, the trees are on the property of another owner the matter is more difficult; but I have frequently found that a representation to the owner has had the desired effect. In one case the front rooms of half a street were dark owing to some high ground opposite on which were a number of overhanging trees; the ground appertaining to army barracks. A representation was made to the commandant, and after a little correspondence and delay all the obnoxious trees were cut down, with very marked improvement to the houses.

The use of outside reflectors, as in city offices, has not so far been found practical for living-rooms.

Second in importance to the lighting of living-rooms is the lighting of staircases and passages, though here the primary object of requiring a window is usually the ventilation. A passage and staircase without a window has been held to be a nuisance in London police-courts where the house was occupied by more than one family, but a prosecution would probably fail in any other case. Little difficulty has been found for the most part in Woolwich in making a moderate-sized window on a dark staircase, where this has been practical.

The cost of putting a small window to light a staircase in an external wall is not much, the district surveyor's fees being frequently the most serious part of the cost. When there is no exterior wall a skylight can sometimes be made, but this is less satisfactory, as it is difficult to clean it and to keep out the rain, and the cost of construction is greater. Failing a window, glass panels in bedroom doors are sometimes useful to a small extent, but the chief substitute for a window as regards light is a light-coloured paper or other wall-surface frequently renewed.

What has been said so far refers, of course, only to old houses. It might have been thought that at this hour of the hygienic day it would be an unheard-of thing for a house to be built in which there was any living-room not well lighted. But even the stringent provisions of the London Building Act do not obviate the occurrence of such cases.

One of the commonest means of defeating the spirit of the Act is the erection of back additions of such horizontal and vertical extent as to shut off most of the light from the back rooms of the main part of the house; in addition to shutting off light from these rooms they necessitate the windows being squeezed to one side of the room, so that a large part of it is always in shade. When the yard between two adjoining back additions is covered with a glass roof (allowed in the London Building Act under the euphonic

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* Part of a paper by Mr. Sidney Davies, M.A., M.D. Oxon., Medical Officer of Health, Woolwich, read at the recent Royal Sanitary Institute Congress at Bristol.

title of a conservatory), not only is most of the light, but also the air, excluded from the rooms in question. New houses on old sites may still be built without sufficient provision of light, and further, new houses may be erected so as to shut out the light from existing ones.

The London County Council has been considering and has prepared amendments to the Building Act which will remove some of the difficulties pointed out above; but it appears to me that the only satisfactory way of ensuring that the dwelling-rooms of new houses are sufficiently provided with the means of lighting by daylight is to enact that no new house shall be occupied unless each habitable room is certified to be properly lighted by daylight.

As regards old houses, what is wanted is a further definition of nuisance, as "any dwelling-room not provided with sufficient and proper means of lighting by daylight."

But let not any sanitary reformer wait for legislation. The prospect of obtaining any useful sanitary measures or amendments seems remote indeed, and meanwhile I can only express the hope that all sanitary authorities may make as good use of the existing Public Health Acts as the Woolwich Borough Council has done.

Books.

The Cathedrals and Churches of the Rhine and North Germany. By T. FRANCIS BUMPUS. (London: T. Werner Laurie. 1906.)

BOTH the subject, the number of examples, and the country over which they are scattered are large—too large, in fact, for it to be possible in most cases for more than a comparatively short account of them to be given—and the work is the result of notes taken on more than one extended tour through this district, architecturally the most interesting perhaps in some ways in Europe. The author has wisely devoted the first three chapters to a general description of the architecture as a whole and its gradual growth from the Romanesque to the fully-developed Gothic; to an account of the remarkable series of churches chiefly, if not entirely, in brick, which are such a striking feature of the Baltic provinces; and, thirdly, to some peculiarities of the Rhenish churches and North German ones generally. A very large number of the cathedrals and churches on or near the Rhine and its tributaries are, of course, tolerably well known, and if Germany is entered through Aix-la-Chapelle one of the first buildings seen, the Dom, possesses those features common to many others—the great Gothic choir, with an apsidal termination and windows narrow and of remarkable length attached to a nave, in this case of octagonal form, of Romanesque, or what we should term "transitional character"—a sharp contrast, which is the result of the absence of that gradual growth and development through many centuries that was the rule in our English churches. Cologne Cathedral stands alone as the "last word" of German ecclesiastical architecture—a complete church of great size, largely due to the influence of the great churches that were rising in France at about the same time. The great Rhenish Cathedrals at Maintz, Worms, and Speyer are mentioned, but only the first-named is illustrated; an exterior view, however, is given of the Abbey Church at Laach. The frontispiece is a north-west view of the imposingly-situated if small cathedral at Limburg on the Lahn. This, as well as some of the churches in the district of the Lower Rhine—Neuss, Calcar, and Xanten—will be familiar to readers of the *Builder* through the fine drawings of the late Mr. H. W. Brewer. Xanten and Calcar are remarkable, too, for the richness of their altar-pieces and furniture generally, and in themselves provide sufficient material for an architect's tour. Among the photographic reproductions with which the work is almost entirely illustrated are several showing the great brick churches of the Baltic provinces, the tower of St. Mary at Dantzig and its picturesque houses, the imposing interiors of the Cathedral of Havelberg with its roodscreen and choir fittings, and of St. George's Church at Wismar; also a general view of the Dom at Lübeck. The chapter devoted to the furniture and fittings of the churches is probably the most attractive. Two interiors, one of St. Mary Gelnhausen (a delightfully picturesque exterior view of which is given earlier in the book) possessing a fine Early Gothic roodscreen, and the remarkable interior of the Dom at Lübeck, which, although a Lutheranised church, still retains its roodscreen, rood, and beam with very elaborate detail, are illustrated and a general description—necessarily concise—of some examples among the many that exist of church furniture of various kinds which have happily survived the changes and vicissitudes through which many of these churches have passed, rendering them for that reason alone worthy of a visit and careful study. The metal font of the Cathedral of Hildesheim, the elaborate example at Limburg, and the rich organ-cases at Lübeck and St. Martin's, Brunswick, are also given.

The author has devoted separate chapters to the description of the churches at Münster, Soest, Paderborn, Hildesheim, Halberstadt, Magdeburg, Naumburg, and Erfurt. At Halberstadt and Magdeburg we again find rich examples of roodscreens, with the altar in the centre of the west face, flanked by doorways leading to the choir. Naumburg boasts of two choirs—east and west—of early date retaining their choir-stalls and two roodscreens, and Erfurt, with its grand apsidal choir and triangular porch approached by a great flight of steps, is perhaps one of the finest groups that Germany has to show.

All these and much more of great interest the author has succeeded in including in the comparatively small space of 350 pages. Some ground plans would have added much to the interest of the work, especially in the cases where the mediæval arrangements are at all perfect; but apart from this the book will be found an interesting one for perusal before, during, and after a tour of any of the districts included in its scope, and of value as a general book of reference to a great many architectural gems of which no other country possesses parallel examples either in form or richness of detail.

Haddon: The Manor, the Hall, Its Lords, and Traditions. By G. DE BLANC SMITH. (London: Elliot Stock. 1906.)

ALTHOUGH the author has drawn a good deal of the material for his letterpress from other sources, including papers published in the *Proceedings* of the local Archæological Society, the story of Haddon Hall and its owners will always be a subject of very general interest, and in this case it is not only concise but is very fully illustrated throughout with reproductions of photographs taken by the author. These show well the various parts of the exterior and interior and also a great many details of the wood-panelling, the stained glass in the windows of the chapel, and the fine series of rain-water pipe-heads that are such a striking feature on the exterior of the buildings. Members of both the Vernon and Manners family are buried in the neighbouring church of Bakewell, and four illustrations are devoted to their monuments. A sketch plan of the Hall and gardens is also given, and on it are shown the points from which the views have been taken. It would have been in every way better if the illustrations, excellent though they are, could have been placed, as far as possible, opposite that portion of the text to which they refer. For instance, the description of the chapel and its windows is given pp. 53-59, the illustrations are, however, facing pp. 12-20. In future editions a more convenient arrangement would be undoubtedly less irritating to the readers of this otherwise excellent description of one of the most perfect mediæval houses in the country.

Elias de Derham, Rector of Harrow. By Rev. W. DONNE RUSSELL. Cambridge: Macmillan & Bowes. 1906.

IN reading the pages of this pamphlet (a paper recently read before the Harrow Architectural Club) one cannot but regret that, in comparison with the importance of the life and work of Elias de Derham, so little should be known. He was a Rector of Harrow, and the author credits him with some reason with the work in the nave of its parish church. He was for the last twenty-five years of his life (1220-1245) a Canon of Salisbury Cathedral, and is described as "Rector novæ fabricæ ecclesiæ." The year 1220 was memorable as having seen the completion of his work in the designing, in conjunction with Walter de Colchester, of the shrine of St. Thomas at Canterbury Cathedral, and the commencement of the new Cathedral that was to take the place of the earlier and smaller building, which had been built within the fortified hill at Old Sarum. That he was "architect" of Salisbury Cathedral in anything approaching the modern acceptation of the term may be doubted; that he was master of the fabric seems more probable, and a man of his skill would hardly fail to leave his mark on this beautiful church, although in what way and to what extent we do not know. He was the friend of Bishops Poore of Salisbury, of Joceline of Wells, and Hugh of Lincoln; he accompanied the first-named to Durham; the author traces him at Wells; he was responsible for the design of the great hall in the Castle of Winchester; and some decorative detail common to Wells, St. Albans, and Lincoln is given in support of the possibility of his having been in some way connected with these great churches. Be this as it may, the facts that have been brought together, covering a period of nearly eighty years, make highly interesting reading, and give a suggestive insight into what must have been a very remarkable career.

Plastering: Plain and Decorative. By WILLIAM MILLAR. Third Edition. (London: B. T. Batsford. 1905.)

TO THE first edition of this large and monumental work we devoted a long article in our issue of September 18, 1897. The appearance of a third edition shows that the book has met with the success it deserved, for it is a large and somewhat expensive book which would hardly have reached a third edition had it not been recognised as a book without which an architectural library could not be complete. As we said in our former notice, the author has produced a book which will connect his name with plastering as that of Tredgold is connected with carpentry. The artistic element in the book, it is true, would not satisfy artists, but that is hardly what such a book is intended for; it is one of practical information and demonstration by a practical man.

We regret to learn that since our previous article the author is dead. In the present edition all the corrections and additions of which the author left any notes have been made, and the matter relating to Portland cement concrete has been in great part rewritten, with an addition giving some description of reinforced concrete, though we do not see that this necessarily comes into the subject; indeed it is remarked that it cannot be treated fully in a book of this kind. However, perhaps some explanation of the nature of this use of concrete was to be looked for, though it comes more under the subject of construction than of plastering; and the reader is referred in a foot-note to works dealing fully with the subject.

The book as a whole, however, is not materially altered, and we need only refer the reader to the high appreciation of it which we have already expressed in the original review above referred to.

Water Softening and Treatment. By WILLIAM H. BOOTH, M.Am.Soc.C.E. (London: Archibald Constable & Co., Ltd. 1906.)

THIS volume comprises two sharply-divided parts, the first devoted to the treatment of water by softening and filtration, and the second to the description of plant and apparatus used as auxiliaries to steam boilers and engines. In the preface the author admits that he has drawn on many sources, and is indebted to various firms for information to supplement his own experience, two points which are clearly noticeable in the succeeding pages. The chapters dealing with the sources of water and the foreign substances occurring therein contain a useful selection of facts which are generally known, but are too frequently ignored by those who have the selection of sites for manufacturing premises. Although dealing in this work with the treatment of water, the advice of the author is that supplies should be secured, if possible, that do not require to be treated, and he suggests that there are often instances where of two or more available sites one can be shown to offer better prospects of

suitable water than the others, not merely in respect of quantity but also of quality. So far as concerns the softening of boiler feed-water and water for industrial purposes generally, the main thing is to eliminate the carbonates of calcium and magnesium, and very frequently the sulphates of the same metals. The manner in which this result can be attained by the aid of chemical reagents is set forth clearly and correctly, although the nomenclature adopted by the author is popular rather than scientific in the respect that he uses such terms as "calcium" and "lime," "magnesium" and "magnesia," as if they were interchangeable, whereas lime is not calcium but calcium oxide, and magnesia is not magnesium but magnesium oxide. The same applies to other alkaline metals and metals of the alkaline earths, which ought to be differentiated from their oxides if confusion is to be avoided.

Chapter VII. has the somewhat comprehensive title of "Water Analysis," a department of work requiring an entire volume for adequate treatment. The author touches very briefly upon the tests for hardness practised in the United Kingdom, and fills the bulk of his allotted space with an account of the method adopted in France by M. A. Taveau. Consequently, the chapter is not so helpful as might be desired.

Next, we come to a series of chapters wherein several types of water-softening apparatus, filters, and oil-separators are described and illustrated. It must always be a rather invidious task to select examples of apparatus for description, and however impartial an author may be, as in the present case, the firms whose manufactures are left out in the cold never feel quite happy. Moreover, it is but natural for readers to draw the inference—which may be quite a wrong one—that the chosen examples are the best. An important point for the user of water-softening plant is to see that the nature of the process and the type of apparatus adopted are those best adapted to his individual requirements. For this reason it is impossible to make a choice without complete particulars of all the appliances and processes available, and such particulars are not here given.

In the second part of the book Mr. Booth deals in a comprehensive and generally satisfactory manner with air-pumps, condensers, circulating-pumps, feed-water heaters—including economisers and superheaters—water-cooling plant for condensing engines, feed-pumps, and injectors. The information presented appeals exclusively to the steam-user, and taken in conjunction with that in the first part renders the work as a whole a very complete collection of data on the treatment of water and the means of applying it in connexion with steam boilers and engines. Unfortunately, however, passages occur here and there which certainly do not suggest that the text has been very carefully revised. Otherwise we should not find sentences like the following:—On p. 4, "Such impurities will deposit in a large pond just as the muddy river Rhone emerges from the Lake of Geneva as a bright stream"; on p. 12, "An independent water supply will usually be cheaper than a public water supply. But some of the public companies pumping hard water put it through the Porter-Clark process and soften it before passing into their distribution mains"; and on p. 152, "In steam at 100 deg. F., or thereabouts, which is practically the temperature of condensers, there are very approximately 1,000 B.Th.U. of latent heat. This number is thus useful for rapid calculation. One pound of steam will have to lose this amount and a little more. If 1 lb. of cooling water disappears it must gain the amount and a little more. The round figure will serve very well for our purpose."

However, in addition to examples of dubious composition, the book contains other sentences which may lead to misconception. For instance, on p. 105, it is said, "Absolutely pure water may be assumed to have an effect on a boiler, and roof-collected rain contains acids, especially in manufacturing districts, and also carbonic acid." Here "no effect" was obviously intended instead of "an effect," but there is nothing to show what is the effect of rain-water, nor why carbonic acid should not be classed with other acids. Again, on p. 121, Schomberg is credited with the paradox, "That a water may be made chemically pure by adding to each litre of water 0·06 gramme of free bromine in the form of potassium bromide." Further, on p. 172, immediately after Table XV., showing that the solubility of gases (except hydrogen) in water diminishes with the increase of temperature, we have the sentence, "At the boiling-point practically all gas is occluded." This is quite wrong, for when the solvent is boiled, the dissolved gas is entirely evolved, except in the case of very soluble substances, such as hydrochloric acid gas, which cannot be expelled by mere boiling.

Although good literary style may not be necessary in scientific treatises, absolutely lucid diction is most essential, and it is a pity that an otherwise excellent book such as this should be marred by any blemishes of the kind indicated above.

The Manufacture of Concrete Blocks and their Use in Building Construction. By H. H. RICE, W. M. TORRANCE, and others. (London: Archibald Constable & Co., Ltd. 1906.)

WITHOUT intending to disparage the valuable information contained in this book, we must remark it is not a treatise, but simply a compilation. It is, in fact, a reprint of two papers, and of extracts from ten other papers, all submitted in competition for prizes offered jointly by the *Engineering News* and the *Cement Age*, of New York. The result is a consensus of opinion on various points connected with the production and application of concrete building blocks, which can be turned up by the aid of the index for reference and comparison. In the paper by Mr. Rice prominence is given to the theory of concrete, but this and the other parts of the subject are discussed in very general terms. The succeeding paper by Mr. Torrance is addressed to those who contemplate the manufacture and use of concrete blocks. It is full of really practical information, and contains numerous illustrations that are likely to be of service to the architect and builder. Among the extracts from other papers there are notes upon such subjects as the position and design of works for the manufacture of concrete blocks, the various forms of such blocks, the selection of materials, the preparation of concrete, moulding, curing, and facing, ornamental and special blocks, waterproofing, cost, and building construction. A good many helpful suggestions will be found in this section of the book, which concludes with two appendices, one giving the rules and regulations covering the manufacture and use of hollow concrete building blocks in Philadelphia, and the other a list of American firms issuing pamphlets and similar trade literature relative to block-making plant. The heterogeneous character of this book is really an advantage to professional men who desire to pick up practical hints on the subject of concrete blocks.

Electric Wiring. By W. C. CLINTON, B.Sc. Fourth Edition. (London: John Murray. 1906.)

THIS book is written as an introduction to the art of indoor wiring. It is specially intended for those who are preparing for the Preliminary examinations of the City and Guilds of London Institute in this subject. Numerous practical examples are worked out, and the meaning is usually clear. In our opinion, it will prove helpful to beginners. In several places, however, the book could be considerably improved.

The definition of Ohm's Law given in Chapter I. is unnecessarily complicated, considering the class of reader for whom the book is intended. The notions of electromotive force, current and resistance are better left somewhat vague so that the beginner may have little to unlearn if he ever reach advanced theory. At the top of p. 26 we read of a three-wire system, with a pressure of 100 volts betwen the outers. We never heard of this system before.

In Chapter III. the author gives a clear description of the method of making a joint, and the explanatory diagrams are good. It is a pity that the author does not emphasise the necessity of having plenty of supports for the casing and tubing. This important detail is frequently neglected by wiremen.

Mr. Clinton considers the simplex tube with the open longitudinal seam the best of the plain tube systems (p. 61). This statement needs to be modified considerably. We agree with him in thinking (p. 65) that the thinness of this type of tubing renders it untrustworthy in places where it may corrode or meet with rough usage. We are surprised that no mention is made about earthing the steel tube. The practically universal adoption of high pressures of supply makes it imperative to secure the metallic continuity of the tubes and to earth the whole system efficiently.

The statement on p. 89 that "double-pin" wall-plugs are only used on 100-110 volt circuits is not correct. The "concentric" type of plug mentioned is rarely seen nowadays. It is bad practice to put a fuse in a wall-plug (Fig. 48), and they ought never to be put in ceiling roses in high-tension circuits (p. 85).

Working Hints for Suction Gas Producers. By A. FLURSCHEIM. (London: *The Gas and Oil Engine Record.* 1906.)

AS A concise description of the various parts of a suction-gas producer installation, and a convenient book of practical directions for the guidance of the attendant, this little volume deserves every praise. After three descriptive chapters the author deals in succession with such matters as the first starting of the apparatus, ordinary starting after short stoppages, charging the generator, attending to the fire, stopping the operation of the plant, and up-keep of the apparatus. He then suggests probable causes and remedies for various disturbances in the installation, and gives simple hints for the avoidance and treatment of gas poisoning. The subject-matter throughout is conveniently arranged for ready reference, and we feel sure that this book will find wide popularity among users of the plant to which it refers.

Where to Live Round London. Edited by PRESCOTT ROW. (London: The Homeland Association. 1905.)

THIS is one of the "Homeland Reference Books," and deals only with the southern district near London; we gather that another similar book is to be issued dealing with the northern district.

It is a very useful publication, giving under the name of each township or village information as to its general attractions, railway communication and ticket rates, subsoil, death-rate, population, places of worship, etc. There is also a chapter on the geology and subsoils of the district, by Mr. W. H. Shrubsole, F.G.S. The names of places are arranged alphabetically. It is a remarkable book to be issued at the small cost of one shilling.

The Fifty-four Hour Wages Reckoner. By a Retired Banker. (Edinburgh: Johnstone Hunter & Co.)

THIS is a small book giving tables of wages based upon a calculation of fifty-four hours being a working week. It gives in tabular form the amount due for a quarter of an hour, half an hour, three-quarters, and an hour on wages at rates of from 2s. to 50s. a week.

Photography: The Watkins Manual. By ALFRED WATKINS. Third Edition. Hereford: The Watkins Meter Co. 1906. 1s.

THIS is the third edition of a most useful and practical manual for amateur photographers, giving detailed instructions in regard to the whole process of photography and the materials and methods employed in it.

RIPON CATHEDRAL.—The north side of Ripon Cathedral has just been adequately protected from the ravages of damp by work in cement-concrete, carried out under the supervision of Mr. H. Williams. The gargoyles have been made to deliver the water from the roof over a smaller area, and the flooring of cement-concrete at the base of the walls keeps out the moisture, which was finding its way into the interior of the building. It is hoped the work may be extended to the east end of the cathedral. The walls have also been underpinned. In the course of the work Mr. Williams came across what he believes to be the foundation of the old Norman cathedral, as the stone exactly corresponds with the stone in the Norman crypt.

BOOKS RECEIVED.

REPORT ON ERRORS IN WORKMANSHIP, based on Measurements carried out for the Engineering Standards Committee by the National Physical Laboratory. (London: Crosby Lockwood & Son; and at office of the Committee, 28, Victoria-street, Westminster, S.W. 10s. 6d. net.)

REPORT ON BRITISH STANDARD SYSTEMS FOR LIMIT GAUGES (RUNNING FITS), by the Engineering Standards Committee. (London: Crosby Lockwood & Son; and at office of the Committee, 28, Victoria-street, S.W.)

ENCYCLOPÆDIA OF PRACTICAL ENGINEERING AND ALLIED TRADES. Illustrated. Vol. IV. Edited by J. G. Horner, A.M.Inst.Mech.E. (London: Virtue & Co.)

THE SYMBOLISM OF CHURCHES AND CHURCH ORNAMENTS: A Translation of the First Book of the Rationale Divinorum Officiorum. Written by W. Durandus. Third Edition. (London: Gibbings & Co., Bury-street, W.C. 6s. net.)

BANGOUR ASYLUM, EDINBURGH.

A RECENT issue of the *Edinburgh Evening News* contains some impressions of a visit to Bangour Asylum for the treatment of pauper lunatics. Alighting from the Edinburgh Lunacy Board's private railway at Bangour Station, the eye, says the writer, is met by what appears to be a series of villa residences, some of larger and others of smaller dimensions, scattered on the sunny southern slope of undulating pasture land. No two houses are alike either in their exterior form or interior arrangement and decoration. Some of the houses are built of white freestone, others of red or yellow, or both combined, some are harled, and a few are made or iron, their plain exterior broken by verandas. In some cases red tiles, in others light or dark blue slates, are used for the roofing. The church, recreation hall, and some of the homes are still non-existent, and will be so when the formal opening ceremony of the asylum takes place at the beginning of October, but there is at present accommodation for about 750 patients, and there are 300 now under treatment. By October the population will be added to by other 200, and the remainder will follow as the internal arrangements of the houses are completed. Grouped round the entrance of the administrative block are the offices of the medical superintendent and the matron, a drug-dispensing room, and telephone exchange. One wing is reserved for female patients and the other for the males, providing accommodation for eighty patients in all. Upstairs there is a dining-room for the Board and medical officers, and private rooms for the administrative staff, while there is also a billiard-room to provide recreation for the staff on a long winter evening.

When a patient is brought to Bangour he is taken to this administration block. He enters a room in which a first examination is made in the presence of the relatives who accompany him. This done, he steps into an adjoining studio with glass roof and sides, where he is photographed, partly to preserve a record of his outward physical condition when received, and partly for identification purposes should he escape. From the studio, which has leading from it a small room for development of the photograph, he walks into a bathroom, where, after having been bathed, he leaves the clothes with which he entered Bangour, and he is then taken to a small bedroom, and put to bed under the care of a special nurse. The doors of these rooms are panelled partly with glass and partly with wood, so that the interior can be seen from the corridor. Afterwards the patient passes into the admission ward in the wing of the building which consists of a general living-room and sleeping-ward. These arrangements are all duplicated in the other end of the building where the female patients are admitted and housed. When, as the result of observation, the medical officer is able to classify the type of patient, he or she is removed to the industrial homes, or to the houses where the acute cases are treated. In some instances the patient may not require removal to another asylum building, the few weeks' residence in the admission house effecting a cure. Quiet and reposeful colours are employed in the rooms, the preponderance being given to greens and blues, the warm colours used sparingly. Every apartment is differently treated, and in the whole range of buildings there are no two rooms exactly alike. There are two peculiarities in all the rooms to which patients have access. The sashes on the windows are so arranged that the windows can be opened only about 3 in., either from the top or bottom, so that a patient, in a moment of frenzy, could not jump out of the window. The other is that all doors open outwards into the corridors and have handles only on the outside. Thus a patient could not go into a bedroom or bathroom and snib or barricade himself in. Throughout the whole asylum there are only two padded rooms, one for a male and the other for a female suicidal patient.

Of the other buildings where patients are housed four are for the use of women who can be industrially employed, each of these houses providing for an average of fifty patients, or 200 in all. There are five industrial houses for male patients, similar in size, which will accommodate 250, while 144 patients will be housed in what are called closed homes, these being for severe cases. A hospital is being erected where ninety patients can be treated, and, as already intimated, there are eighty housed in the administrative, block, and twelve are employed at the farm buildings—about 780 altogether.

The provision of food for such a large colony is an essential part of the undertaking, and in that matter the farm occupies an important place. The original buildings have been extended and remodelled till they are now thoroughly well equipped for the housing of cattle and the rearing of pigs, while a large garden is being prepared for raising vegetables and other crops. The estate altogether consists of 900 acres, of which about 150 acres are occupied by the building, 500 acres are under grass, and the remainder is arable land most of which will be used for potatoes and oats.

The arrangements for the cooking and distribution of food are very complete. There is a large kitchen with a lantern-shaped roof, the walls all lined with white bricks. In the centre of the room are two sets of triple 80-gallon steamers, and one quadruple set of 40-gallons for boiling porridge or meat, sufficient to supply 1,000 persons. At one side wall there is a range of four large iron steam chests with numerous divisons for cooking potatoes, fish, etc., and four smaller chests for use either singly or together. Between the centre steamers and the other side wall are large iron carving tables, steam heated, and into the lower part of this wall are built a series of steam-jacketed chests which slide outwards into a covered way for the conveyance of food to a waggon that distributes it to the different houses. The cooks, after placing the food into dishes in these steam chests, which move on wheels and can be drawn into the kitchen for loading, push them back into position, and there the food can remain, kept warm till it can be removed. The waggon into which the dishes are ultimately conveyed is also heated, so that the cooked dishes are delivered in good condition at the various houses, though the distance covered is considerable, about three-quarters of a mile intervening between the houses furthest to the east and those most westward. The only meal not supplied from the general kitchen is tea, which is provided for the inmates by the staff at each of the houses. Attached to the kitchen are roomy sculleries, and on the other side of the covered way already referred to are the stores. A separate structure is occupied by the bakery, also a roomy building, lined with white enamelled bricks. There are two ovens, one of which —Thomson's patent—is large enough to bake at one time 220 2-lb. loaves. The dough is mixed in a machine driven by an electric motor, In the upper part of the building are commodious flour stores.

The laundry, situated not far from the kitchen, is equipped with every modern appliance. The clothes are delivered at one end to the washers and put into large automatically revolving washing machines; others are cleaned by hand in a row of wash-tubs, and when freed from dirt they are passed into a drying room and from thence into the mangling and ironing room. At one end of this latter chamber is the apartment for mending, and then the clothes pass into a dispatch-room, and are sorted out for the different houses. The delivery baskets are passed through an opening in the wall to the carter for conveyance to their destination. The laundry will be carried on by forty-six patients under the direction of a staff of five experienced workers, and these are housed in an adjacent building.

Just within the entrance gate of the estate is situated a large power station, the chimney-stalk of which is 120 ft. high. Here there is machinery for providing electrical energy to the extent of 400 horse-power, a blacksmith's shop, painter's shop, and other workshops necessary in the carrying on of such a large undertaking. The administrative buildings generally are on a scale that will be sufficient without extension for about double the number of patients at present chargeable to the parish, so that when other detached dwellings require to be erected no addition will be needed to the administrative blocks other than an increased equipment. The corrugated iron buildings which were put up partly on the ground of economy and partly because they were needed in a hurry have not proved a great success. Though only two years in occupancy, they have already needed repairs. As the original cost was 80*l.* per bed as compared with 100*l.* per bed for stone buildings, it is not likely that the Lunacy Board will venture further in that direction.

The water supply for the asylum has been obtained on the estate, and the reservoir is sufficient for the storage of 16,000,000 gallons of water, quite ample for all requirements. The drainage system is most complete, the sewers leading into septic tanks from which the water, thoroughly purified, is discharged into the Broxburn Water. The railway and waterworks were made by Messrs. Leslie & Reid, C.E., but the buildings, water-distributing system, and drainage have all been designed by Mr. Hippolyte J. Blanc, R.S.A., architect, Edinburgh, and their execution has been superintended by him and his assistant, Mr. Cairns. There have been altogether about fifty separate contractors employed up to this time.

The institution not being completed yet, its exact cost cannot be stated, but it is expected that it will be within the original estimate of 300,000*l.*, probably by about 10 per cent. The sum stated includes the purchase of the estate and the construction of the railway and waterworks.

Illustrations.

BIRMINGHAM WAR MEMORIAL.

A MEMORIAL to the memory of Birmingham men who fell in the war in South Africa has been erected in Cannon Hill Park, Birmingham, and the monument was unveiled by Lieut.-General Sir Ian Hamilton last June. It is of red granite, standing on granite steps, and is surmounted by a bronze group 11 ft. 6 in. high and 5 ft. at the base, and on a rising base, with emblems and attributes of war, is a gun-carriage flanked on each side by a soldier pushing forward the gun. The men represent Courage and Endurance. Standing on a globe is the figure of Peace. In one hand, extended, she holds the wreath of glory to the honoured dead, and with the other she supports a shield on which are engraved the city arms. In the front is a bronze bas-relief of two figures representing Sympathy and Grief, holding wreaths and supporting a shield upon which is inscribed the dedication:—

TO
THE GLORIOUS MEMORY
OF THE
SONS OF BIRMINGHAM
Who fell in the South African War, 1899-1902, and to perpetuate the example of all who served in the War, this Memorial is erected by their Fellow Citizens.

The total height from the ground level of the monument is about 25 ft., and the total width, including the steps by which it is approached, is 25 ft. The number of names inscribed on the panels is 521. The group was cast in two pieces by Mr. Alexander Parlante by the Cere-perdu process. The granite work was carried out by Macdonald & Co. The whole work was designed and modelled by Mr. Albert Toft.

CHURCH OF S. CHAD, LONGSDON, STAFFORDSHIRE.

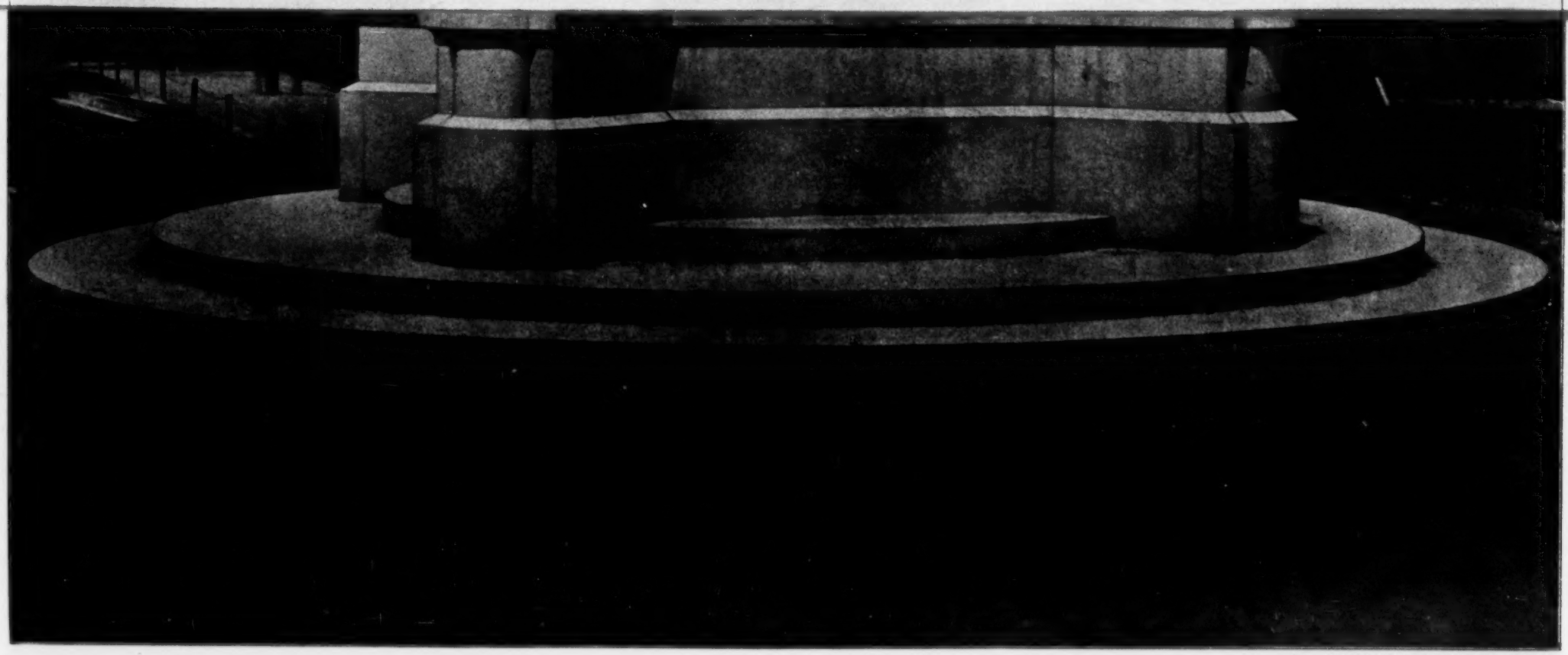
THIS church consists of a nave, north aisle, chancel, priests' and choir vestries, and it will accommodate about 350 people. Ladderedge stone is used for the walling, and red Alton and Roches stone for the windows, piers, quoins, and other dressings.

The general contractors were Messrs. Thomas & Henry Grace, of Leek. The architect was Mr. Gerald C. Horsley. An illustration of the exterior appeared in our issue for September 17, 1904.

SKETCHES WITH THE ARCHITECTURAL ASSOCIATION EXCURSION.

THESE sketches are given in connexion with the excursion of the Architectural Association to Stamford, a report of which was commenced in our last issue and is concluded in this.

ROMAN CATHOLIC CHURCH, CLAREMORRIS.—A new Roman Catholic church is being built at Claremorris. It consists of nave (30 ft. wide in the clear), with a lofty pointed arcade; aisles, transepts, chancel, and apsidal termination, two side-chapels, cloister, priests' sacristy, and boys' vestry. The total length of the interior is about 140 ft., and the width across the transepts nearly 100 ft. The height of the apex of the western gable will be over 70 ft. The contractors are Messrs. J. and W. Stewart, of Dublin and Belfast. The materials used throughout were Irish, and, as far as possible, local—the native limestone for the walls, Killaloe slates for the roofs, Wexford cement in the foundations, black marble for the altar steps. Messrs. Doolin, Butler, and Donnelly, of Dublin, are the architects.



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SOLDIERS' WAR MEMORIAL, BIRMINGHAM.—Mr Albert Toft, Sculptor.

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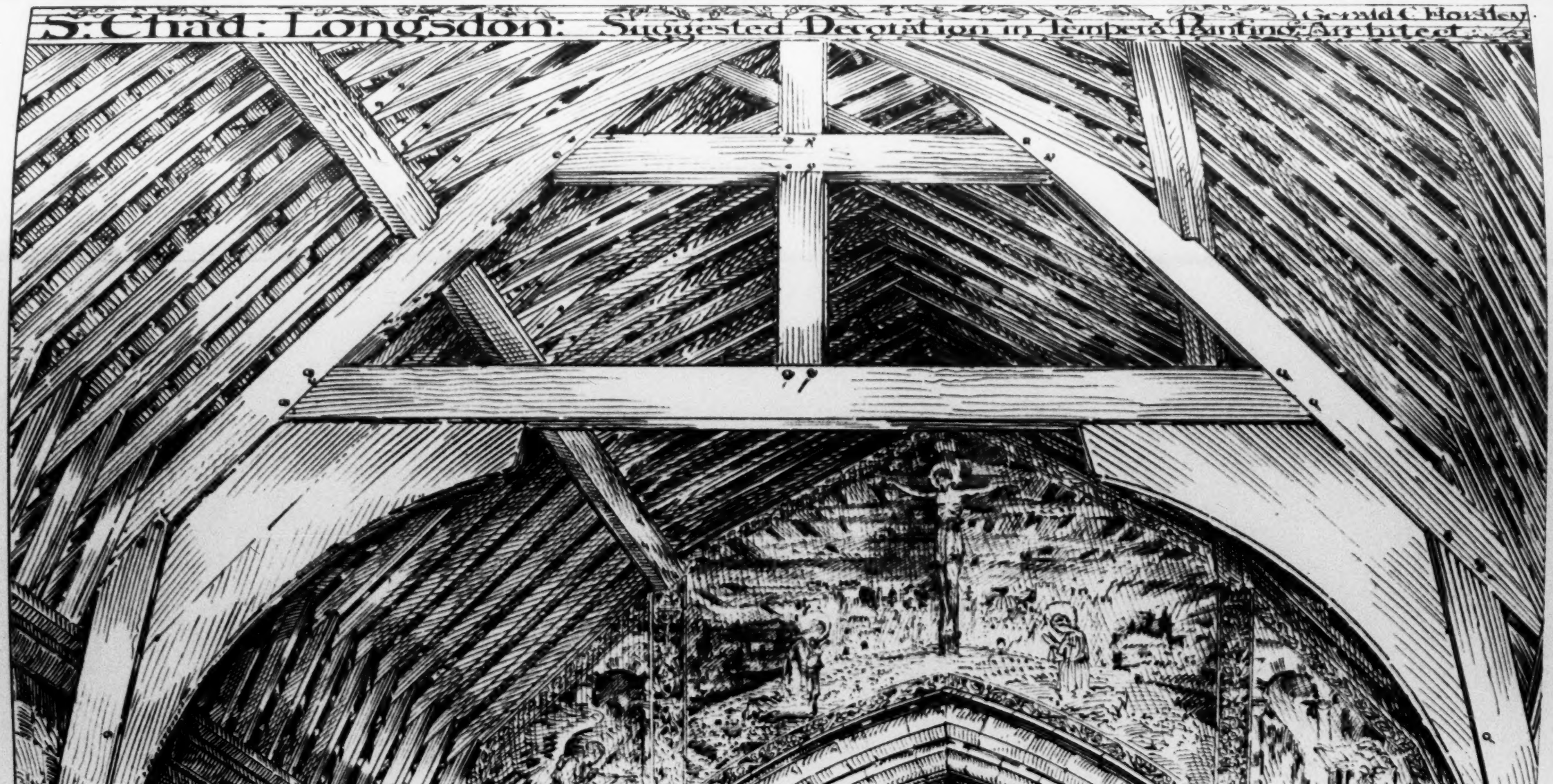
S. Chad: Longsdon: Suggested Decoration in Tempera Painting. Gerald Chorley. Architect.



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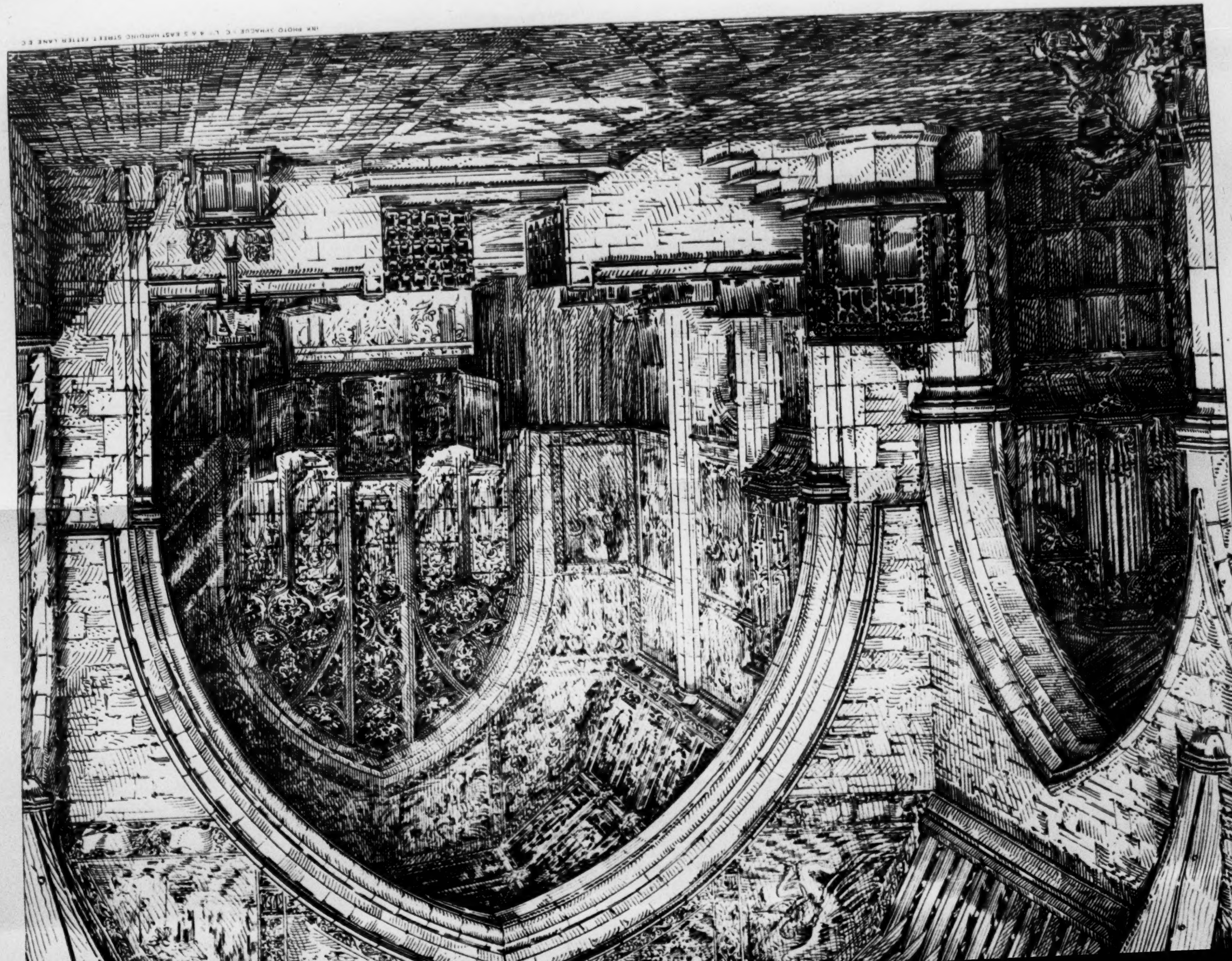

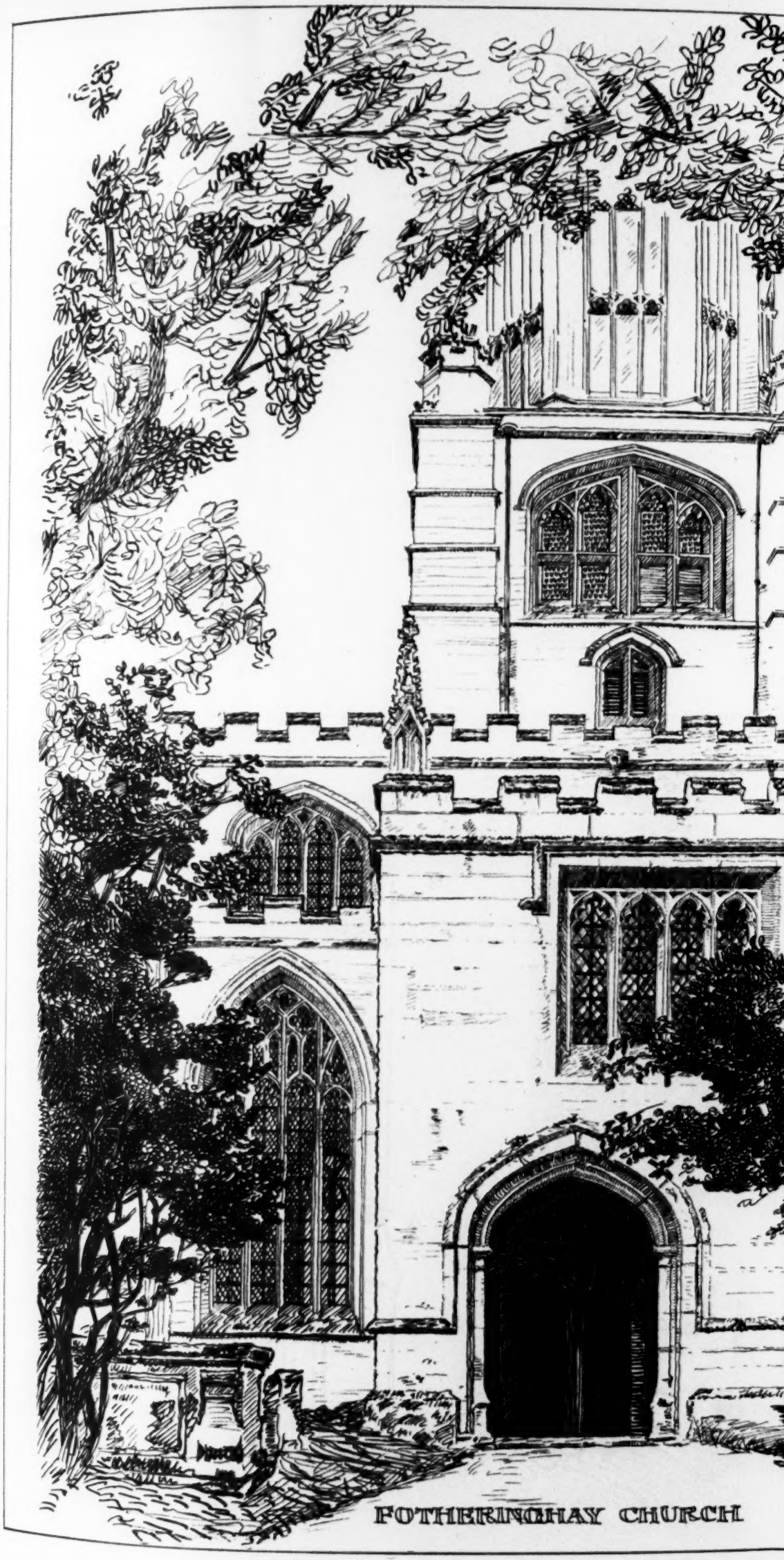

FOTHERINGHAY CHURCH

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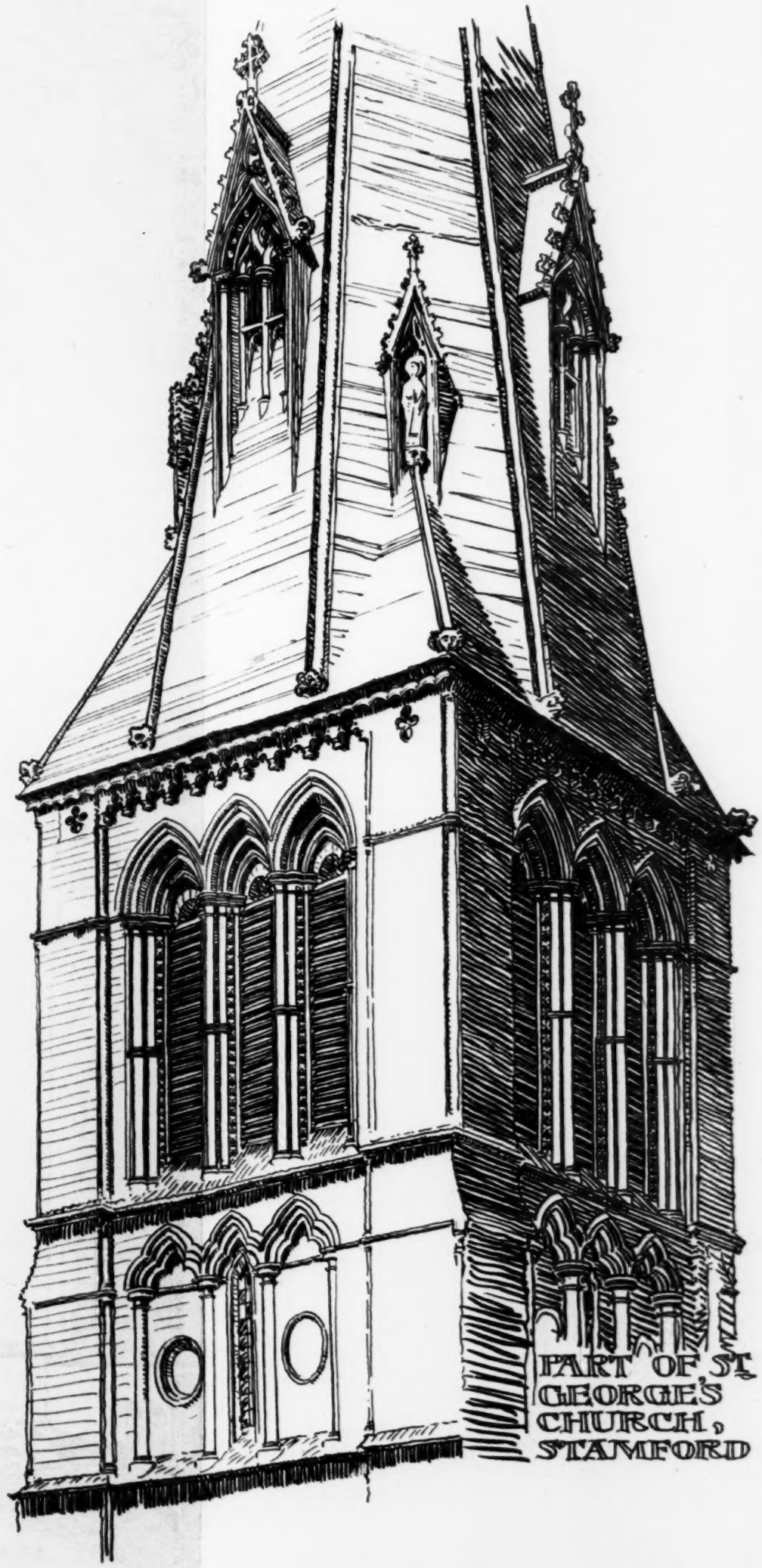

PART OF ST. GEORGE'S CHURCH, STAMFORD

PHOTO LITHO SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

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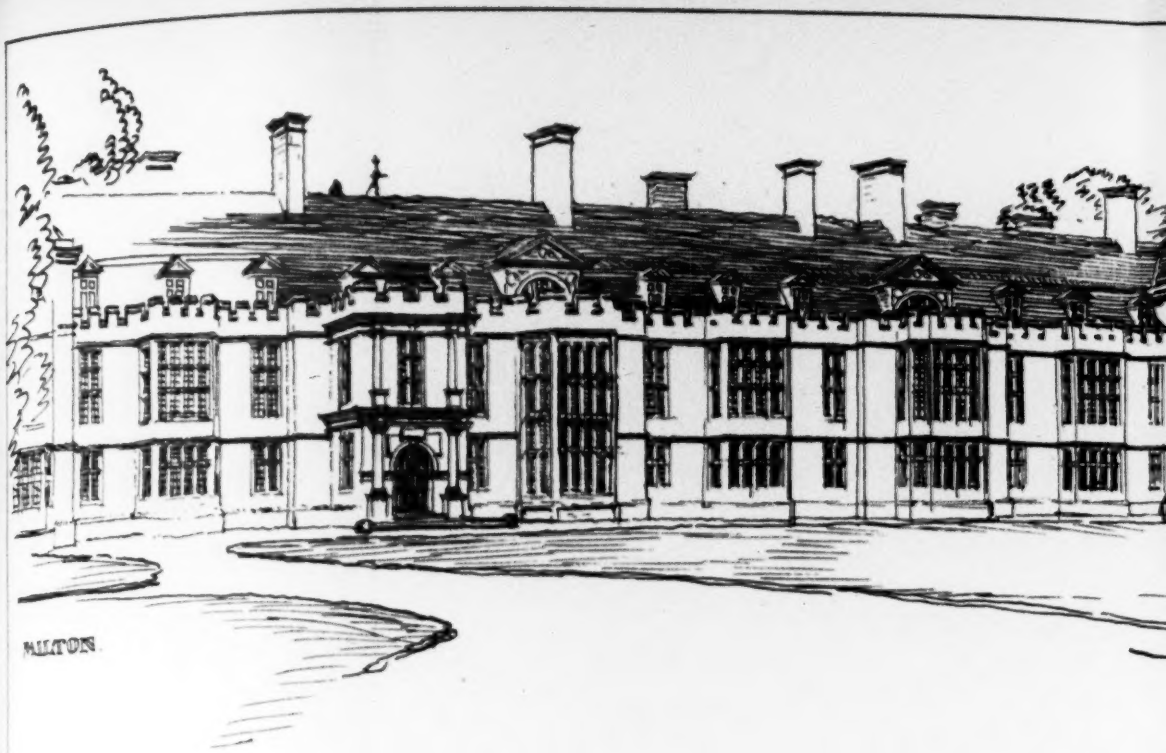
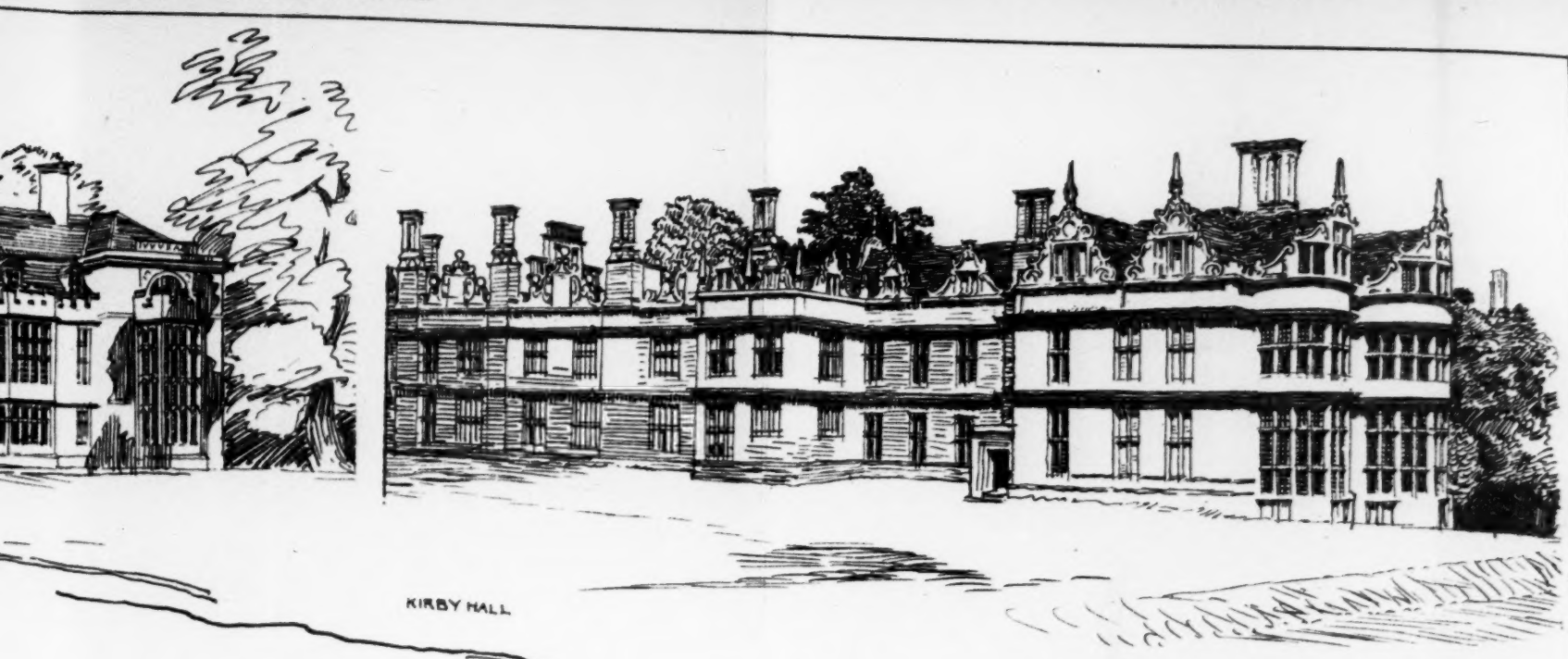


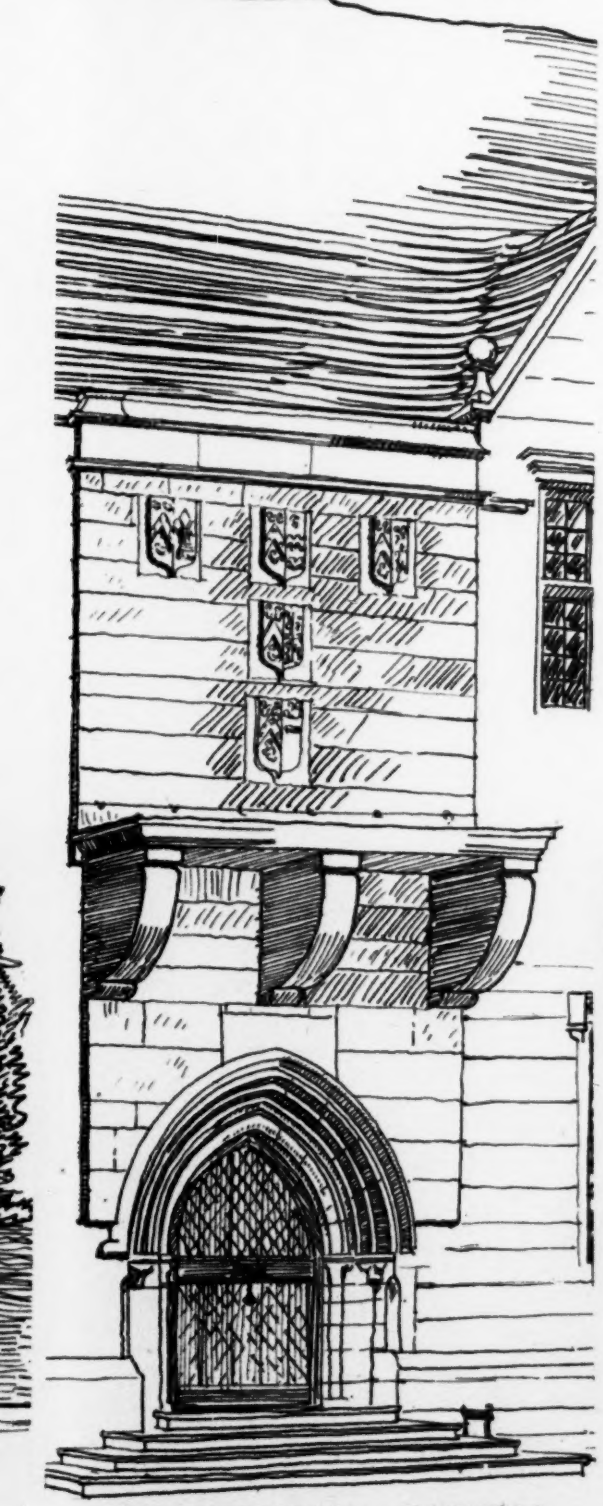
MILTON.

THE PORCH, CLINTON.



KIRBY HALL.

MARHOLMN CHURCH



ROCKINGHAM CASTLE.

THE OFFICES WING
THORPE HALL.

PHOTO LITHO SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

Correspondence.

REDNESS OF WATER FROM HOT WATER SERVICE.

SIR,—With reference to your note in the "Correspondence" column of last week's *Builder*, I am at present dealing with an installation in a mansion served by London water from which the water came quite red with rust. The piping in this instance was ungalvanised, although the original cause of the trouble was not due to this, but to faulty construction, causing several parts of the apparatus to become airlocked from time to time, which it is well known will set up rust very rapidly.

In my opinion the use of galvanised pipes and boilers in domestic hot water service is not an absolute proof against rust, although it is readily agreed that for good work it is proper to use it as a protection to the piping as far as it goes. Considering, however, it is practically impossible to have every part of an apparatus thoroughly galvanised (such as interior of sockets), the risk of starting rust exists, should the apparatus be so arranged as to cause temporary air collections in the pipes. In many cases the sets and bends of an apparatus are ungalvanised also, having been heated in the fitting and not regalvanised afterwards, which adds also to the risk. In the instance to which I am referring even the galvanised tanks and cylinder became rusty and actually yielded rust, the whole of the interior galvanising being eaten away in the course of two years. Even the brass and gun-metal fittings had become thickly coated with it, and in the case of the gun-metal nickel-plated towel dryers, it was found necessary to provide new, as the inner surfaces had become so badly coated by the action of same.

I should have no hesitation in fitting up a hot water service in London *with plain red steam tube, if necessary*, having done so in many cases in the past. Provided an apparatus is properly designed with the continual gradients, open air pipes from all highest points, suitable cold supply pipe, and other details requisite to meet the requirements of a perfect system, there should be no difficulties arising from the cause under discussion.

THOMAS POTTERTON.

MONEY DEPOSITS AND MAKING-UP STREETS.

SIR,—A Borough Council are asked to take over a new street. Their Surveyor made a plan and prepared an estimate, which was approved by the Council, for "making-up this street, providing and fixing kerb and channel, paving the footpaths, paving street crossings, and reforming the necessary gully work, etc. (when the roadway was first formed, previous to the houses being built, the sewers, gullies, etc., were put in at the expense of the owner as required by the Council and under their supervision), amounting to 495*l.* 1s. 8d." This amount, apportioned to various owners, was duly deposited, and the Council advertised for tenders, accepting one (the lowest) for 375*l.* 16s. for the work.

The difference between the Council's estimate and the contractor's estimate shows a balance of 121*l.* 5s. 8d., due to the various owners.

Twelve months have expired since the money was deposited, and the Council's Surveyor now says, upon being applied to for balance, it is necessary to reapportion the work, "as other expenses have been incurred in connexion with the making-up and paving, such as gully connexions, etc. (these were included in their original estimate), which increases the cost beyond the sum mentioned in the contract."

Can the owners resist any charge for extra work beyond that included in the Council's original estimate and for which the money was deposited, and demand the balance which Council hold in hand?

OLD SUBSCRIBER.

*** It is impossible in these columns definitely to reply to the legal question raised by "Old Subscriber" on the facts as stated by him. A considerable number of statutes govern this subject, and different considerations arise in connexion with Metropolitan or extra Metropolitan local authorities. The Local Authorities have power to agree to make up roads, and in the Metropolitan area where the estimated expenses exceed the actual expenses sect. 105 of the Metropolis Management Act, 1855, expressly provides that the balance shall be repaid to the owners. Where the local authority acts upon its own initiative, the statutes contain express provisions enabling owners to object to the provisional estimates and to the final apportionments in certain events, but within certain specified times. Alterations in the specifications, plans, etc., have also to be published, giving the owners opportunity to consider and object to them. Whether acting by agreement or under statutory powers it would appear that the local authority could not apportion at will or at any time, but "Old Subscriber" had better consult his legal advisers.—ED.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—VI.

13.—*Glazing.*

AS a general rule the thickness and dimensions of glass sheets used for roof-covering are dictated by custom, and the relation of thickness to dimensions is similarly determined.

This is not a very scientific method of procedure, and it is desirable that the proportions of glass sheets should be calculated as are those of other materials used in the form of beams or slabs.

Unfortunately, as pointed out in Article V., very few data are available with regard to the mechanical properties of glass, and, as roof-frames must be of sufficient strength to withstand sudden shocks and blows, as well as steady and uniformly-distributed loads, it is not possible to rely altogether upon precise mathematical computations.

Nevertheless a very fair idea of the most suitable proportions may be gained by applying beam formulæ to the calculation of the stresses due to given loads and to the determination of safe loads for glass sheets of given dimensions.

In cases where the glass is supported along all four edges due allowance should be made for the assistance so afforded.

To illustrate the foregoing method of calculation let us assume that a sheet of plate-glass measuring 72 in. by 19 in. by ¼ in. thick is supported by sash-bars spaced so that the clear span of the sheet is 18 in., and that it has to carry a uniformly-distributed load of 20 lb. per square foot.

(*a*) Considering a portion of the plate 12 in. wide the bending moment in accordance with the usual formula is

$$M = \frac{W l}{8} \quad \ldots\ldots (1),$$

where M = maximum bending moment.
W = uniformly-distributed load on the portion considered.
l = length of span in inches.

Then we have

$$M = \frac{30 \times 18}{8} = 67{\cdot}5 \text{ inch-pounds.}$$

(*b*) To compute the extreme fibre stress we can use the formula

$$p = \frac{M h}{I} \quad \ldots\ldots (2),$$

where p = intensity of stress in the extreme fibres.
M = maximum bending moment.
h = distance of the extreme fibres from the neutral axis, assumed to be midway between the top and bottom of the plate.
I = moment of inertia of the section.

We have already found in (*a*) the value of M to be 67·5 inch-pounds. The value of h, on the foregoing assumption, will be ¼ in. ÷ 2, say, 0·25 ÷ 2 = 0·125 in., and the value of I the moment of inertia of the section is

$$I = \frac{b d^3}{12} = \frac{12 \times 0{\cdot}25^3}{12} = 0{\cdot}015625.$$

Substituting this and the other values in formula (2) we have

$$p = \frac{67{\cdot}5 \times 0{\cdot}125}{0{\cdot}015625} = \frac{8{\cdot}4375}{0{\cdot}015625} = 540 \text{ lb. per sq. in.}$$

Taking the tensile strength of plate-glass as the basis of comparison, at the value of 2,850 lb. per square inch as stated in Table XI., we have a factor of safety equal to 2,850 ÷ 540 = 5·277.

(*c*) If the plate were supported as a plate along all four edges the bending moment would be considerably less than that calculated in (*a*), for experiments upon concrete justify the assumption that a slab so supported will carry one and a half times the load that it will carry when supported only at the ends.

Consequently, if the bending moment be calculated by the equation $M = \frac{W l}{12}$ we obtain

$$M = \frac{30 \times 18}{12} = 45 \text{ inch-pounds.}$$

(*d*) The corresponding extreme fibre stress is

$$p = \frac{45 \times 0{\cdot}125}{0{\cdot}015625} = 360 \text{ lb. per sq. in.}$$

Thus, taking the tensile strength of plate-glass as the basis of comparison, as before, we have a factor of safety equal to 2,850 ÷ 360 = 8, nearly.

(*e*) To find the breaking load for the portion of the plate before considered we first find the moment of resistance (R) of the section by the usual formula

$$R = \frac{p I}{h} \quad \ldots\ldots (3)$$

Taking p = 2,850 lb. per square inch, as given in Table XI.,
I = 0·015625 as calculated in (*b*).
h = 0·125 " "
and substituting these values in formula (3) we have

$$R = \frac{2{,}850 \times 0{\cdot}015625}{0{\cdot}125} = 356{\cdot}25 \text{ inch-pounds.}$$

Next, representing the breaking weight by the symbol W, we find by formula (1) that the bending moment is

$$M = \frac{W \times 18}{8} = \frac{9}{4} W \text{ inch-pounds.}$$

Then, as M = R, the value of W, the required breaking load is

$$W = \frac{4}{9} 356{\cdot}25 = 158{\cdot}33 \text{ lb.}$$

(*f*) If the plate were supported along all four sides the foregoing calculations would become

$$M = \frac{W \times 18}{12} = \frac{3}{2} W \text{ inch-pounds;}$$

and as R = 356·25 inch-pounds, as before, the breaking load is

$$W = \frac{2}{3} 356{\cdot}25 \text{ lb.} = 237{\cdot}5 \text{ lb.}$$

If the transverse strength of glass, 1,500 lb. per square inch, as given in Table XI., were employed in calculations (*a*) to (*f*) the factors of safety would be considerably reduced.

Thus, the factors previously calculated would become

(*b*) 1,500 ÷ 540 = 2·77.
(*d*) 1,500 ÷ 360 = 4·16.

Bearing in mind the liability of glass employed as a roof-covering to be broken by unexpected loads or shocks the factor of safety should always be ample.

The foregoing calculations are intended merely for the purpose of indicating the manner in which the proportions of glass sheets may approximately be determined or verified. More precise computations are scarcely possible owing to the lack of data as to the strength of glass and particularly as to the value of the modulus of transverse rupture.

The student will find it interesting as well as instructive to make similar computations for examples of glazing which have come within his own experience.

When deciding upon the size of the sheets to be employed in roofing it should be remembered that large pieces are always more costly than smaller ones, that the price increases with the thickness, and that the expense involved by accidental breakages is proportionately heavy for large sheets.

On the other hand, so far as first cost is concerned, the unnecessary multiplication of sash-bars may involve as much expense in the form of labour and materials (chiefly the former) as would cover the additional outlay necessitated by glass of slightly larger size and thickness.

As far as possible the arrangement of sash-bars should suit the sizes of glass that can be obtained from stock and without waste in cutting.

Curved sheets are charged at higher rates, and unless otherwise ordered the smooth surface of rough plate-glass will be found on the outside after curving. This is not desirable, for as the rays of light are reflected the slightest undulations or other irregularities are thereby rendered very apparent. When the rough surface is on the outside the rays are absorbed, and the irregularities of the surface are not readily detected by the eye.

A point worth noting is that second-hand plate-glass can always be obtained from the insurance companies at low rates.

Allowance must always be made for the expansion and contraction of glass with temperature variations. The amount of expansion can readily be calculated from the co-efficient given in Par. 12. If sufficient

margin be not allowed the sheets will probably be broken in hot weather.

14.—*Glazing with Putty.*

The old-fashioned method of glazing with sash-bars and putty is still largely used in roof-work. Timber-bars have been recommended on the ground that it is more easy to make the covering watertight with them than with steel or other metallic bars. The reason given in support of this view is that the metal does not expand and contract equally with the glass, and consequently that the putty is liable to become cracked, thereby allowing water to pass between the glass and the sash-bars.

When considered in connexion with the values of the co-efficient of expansion for glass, timber, and steel this reasoning does not seem to be very convincing. The value of the co-efficient of expansion for deal is 0·00000247, and, taking this as representing timber generally, the linear expansion of the three materials per inch per degree Fahrenheit is as follows :—

Material.	Coefficient of Expansion.		Differences.
Glass	0·00 000479		—
Timber	0·00000247	....	−0·00000232
Steel	0·00000650	....	+0·00000171

Thus, the fact appears that, so far as expansion and contraction are concerned, glass and steel are more in harmony than glass and timber.

In the case of zinc, which is now largely used for sash-bars, the co-efficients show a difference of (0·000016 — 0·00000479) = 0·0000112, or nearly five times that between timber and glass.

Skylights are usually designed with the sash-bars parallel to the slope of the roof, and when the length permits the panes of glass are run continuously from top to bottom without cross-bars to interfere with the free discharge of rain-water.

If the length is such that single sheets of glass become inadvisable or impossible the panes are overlapped. Where the panes are large and heavy they should be hung together by zinc or copper clips, as shown in Fig. 29.

The lap of half an inch is generally recommended for roofs of average pitch, but this lap is frequently insufficient. The overlapping surfaces rarely fit closely, and thus any water retained may be drawn up the joint by capillary attraction or blown up by the wind, and if the lap is not wide enough it may drip over the head of the lower sheet.

Some difference of opinion exists as to the best direction of the sash-bars in roofs that are chiefly covered with glass.

The following quotation is taken from a well-known treatise on roof construction* :—

"The ridge-and-furrow system admits of easy access for repairs, but it is evident that where the ridge and furrow follow the curve or pitch of the roof one side of the sash-bars suffers more from the weather than the other, destroying the putty, whereas when the sash-bars are parallel to the main transverse ribs the water will run off the roof more freely."

The sash-bars of large roofs are usually spaced from 12 in. to 20 in. apart, and supported at intervals of from 6 ft. to 8 ft.

Timber bars should be of sufficient stiffness to afford adequate support to the glass, otherwise it may be liable to considerable flexure in the longitudinal direction of the sheets, which will have to be thicker than would otherwise be necessary, in order to avoid undesirable strain.

Steel sash-bars must also be proportioned for the weight to be carried. They usually consist of tee-bars from 1½ in. to 2 in. wide across the flange, and from 1 in. to 2 in. deep, measured in the direction of the leg. Bulb tee-bars are useful for glazing, as the bulb forms a protection for the putty (see Fig. 30).

Zinc sash-bars, of which a few representative types are illustrated in Fig. 31, are made in great variety of sheet metal, but are only suitable for light work unless fitted with steel tongues, as shown in Fig. 32, to insure the requisite rigidity.

Small panes of glass should be *back-puttied*, an operation that is performed by spreading a layer of putty over the narrow part of the rebates upon which the glass is bedded. After the glass has been placed in position the panes are *front-puttied* by filling-in or stopping the rebate with putty to a triangular section. The excess of back putty should not be removed until the front putty has set, a process that occupies from four days to seven days.

When steel sash-bars are employed the glass should be laid on a strip of lead, asbestos, felt, or other packing, so that it does not come into direct contact with the metal. The steelwork should be primed before glazing is commenced. Either red lead or thermoplastic putty should be used for metal bars.

Thermoplastic putty is a special preparation containing a proportion of tallow which, although not preventing the material from hardening in a few hours after it has been used, causes it to become plastic when warmed by the sun and to harden again when the temperature falls. The great advantage claimed for this putty is that it does not become loosened by the expansion and contraction of glass under temperature variations.

* "Iron Roofs" (second edition). A. T. Walmisley, M.Inst.C.E.

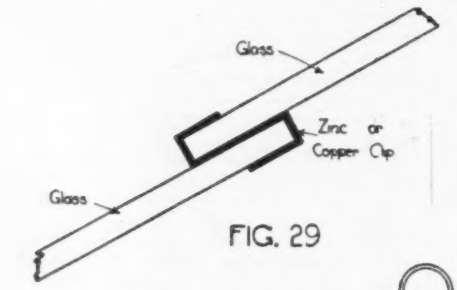


FIG. 29

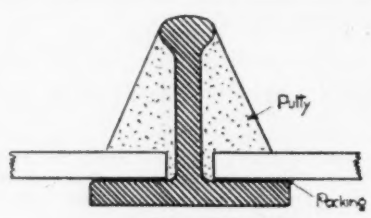


FIG. 30

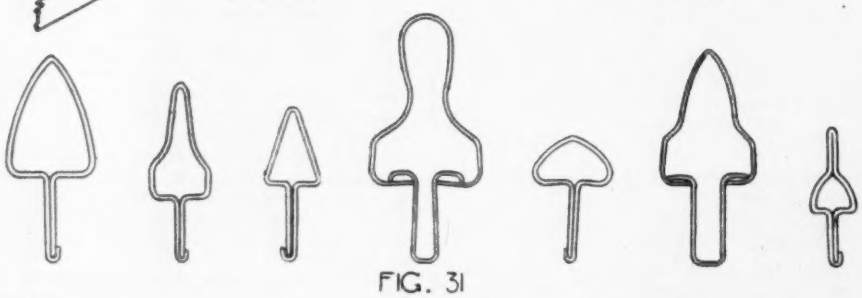


FIG. 31

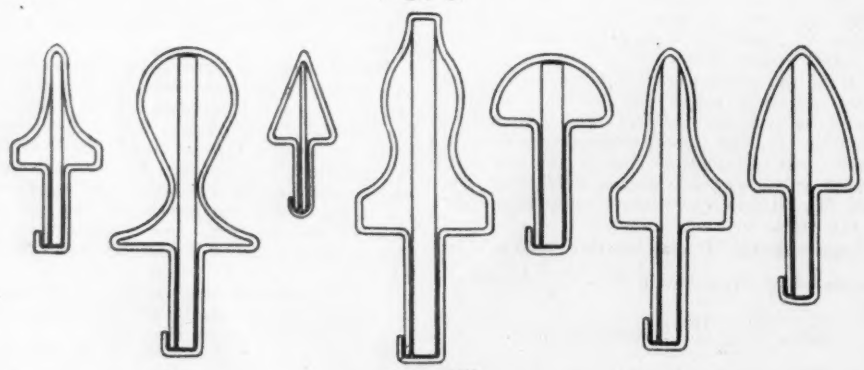


FIG. 32

Illustrations to Student's Column.

Obituary.

MR. JAMES DREDGE, C.M.G.—We regret to notice the death, on Wednesday last week, of Mr. James Dredge, who for a period of thirty-six years was joint editor with Mr. W. H. Maw of our contemporary *Engineering*. Mr. Dredge was born in 1840, and at the age of eighteen he entered the office of the late Mr. David Kinnear Clark. Four years afterwards he obtained an appointment as engineering assistant under the late Sir John Fowler, and in that capacity took part in the construction of the Metropolitan District Railway and other important undertakings carried out by that eminent engineer. Towards the close of the year 1865, Mr. Dredge turned his attention to technical journalism, becoming associated with the late Mr. Zerah Colburn in the establishment of *Engineering*. As joint editor of that journal, Mr. Dredge has done much in an unobtrusive way to forward the progress of mechanical science, and has taken an active part in various international exhibitions held in Great Britain and other countries. He was created a Companion of the Order of St. Michael and St. George as an acknowledgment of his services as the Commissioner-General for this country at the Brussels International Exhibition of 1897, and was a member of the Institutions of Civil and Mechanical Engineers and of other scientific associations.

General Building News.

PLYMPTON ST. MAURICE, DEVON.—One of the most interesting of the smaller churches of Devon is the Parish Church of Plympton St. Maurice. A Saxon church stood on the site of the present one, the earliest portion of which is the transitional Norman tower arch. The church now consists of nave, north and south aisles, and chapel on the south side, mostly XVth century work, but with some few earlier fragments. At the west end is a picturesque granite tower of good proportions. The church with the exception of the nave roof was restored in 1879 under the direction of the late Mr. J. D. Sedding. The work at that time included the beautiful screens between the nave and chancel, and across the aisles. The nave roof was untouched. This had been put up in 1869, replacing one that dated from 1730. Although poor in design and out of harmony with the other roofs, it was not thought desirable to interfere with work that had been so recently completed. During the last few years, however, it became evident that the roof was in a bad and dangerous condition, and the rector (Rev. H. T. Hole), churchwardens, and parishioners resolved on having an entirely new roof of the best construction, in keeping with the architecture of the church. The roof has been erected from the design of Mr. James Hine (Hine & Odgers, Plymouth) and the work—for which Mr. A. Andrews was contractor—is now completed, and the Bishop of Exeter officiated at the dedication on the 16th inst. It is a "waggon" roof, without horizontal ties, of the Devonshire type, and is enriched with carved wall plates and forty-five bosses at the intersection of the moulded oak ribs, illuminated in proper colours. The five nearest the chancel are, in the centre, the B.V.M.; the arms of Redvers, the lord of Plympton Castle and Manor, and the probable founder of the church which succeeded the Saxon church; of St. Thomas of Canterbury, to whom the church was rededicated after his martyrdom; of the Priory of Plympton; and of John Brackley, who at the end of the XIVth century gave the chapel of St. Maurice and endowed it. The chapel remains and is in constant use. The endowment was appropriated in the time of Edward VI. The

church contains several monuments of interest, including a tablet to the memory of the Rev. Samuel Reynolds, father of the great painter; and a monument to Sir Joshua, erected from the design of Mr. Hine in 1904, and containing a fine medallion portrait in statuary marble by Mr. Derwent Wood. Reynolds was baptised in the church, July 30, 1723. The grammar school of which his father was the master, and in which the son made his first drawing (a mullioned window in perspective), still stands, in a fairly good condition, and very much as it was in the boyhood of Reynolds. Sir Chas. Locke Eastlake, P.R.A., Benjm. Haydon, and Mr. Chas. Locke Eastlake received a portion of their education in this celebrated school. Sir Christopher Wren was member of Parliament for Plympton in the reign of Charles II., and was the architect, it is believed, of Plympton House, a large and important residence—of Portland stone and brick—in this ancient borough.

WESLEYAN CHURCH AND SCHOOL, WREKENTON, GATESHEAD.—The foundation-stones of the new Wesleyan church and school at Wrekenton were laid on the 8th inst. The new buildings, which are to be built of stone and which comprise church, school, three classrooms (one to hold 100 children) and a church parlour, are estimated to cost 1,500*l*. The architect is Mr. James Orwin, of Newcastle, and the contractor Mr. Robert Davison, of Felling. The chapel, which will stand in a prominent position in the Springwell-road, will have seating accommodation for 230, and the school accommodation will be 250.

GREEK CHURCH, CARDIFF.—The Greek community of Cardiff are about to erect a church on a site situate at the rear of St. Mary's Church, between North Church-street and the West Junction Canal. The church is designed in the Byzantine style in the shape of a Greek cross. The part to be built at present includes the nave, narthex (with gallery over), and sanctuary, providing accommodation for 250 worshippers, and provision has been made in the plans for future extensions of the north and south transepts, with further accommodation for 100. The centre portion of the nave will be covered in by a copper dome, 28 ft. in diameter, from which light will be obtained through sixteen clearstory windows. The roof of the sanctuary is also covered in with a copper dome. The walls of the building will be built with local brickwork, with red facing bricks and Bath stone dressings. The floors will be of mosaic and wood blocks, the semi-circular arches carrying the dome will be of red pressed bricks, and the interior walls for the present partly pressed bricks and plaster, and the whole will be heated by hot-water on the low-pressure system from a chamber in the basement. The present structure will cost slightly under 2,000*l*. The work has been entrusted to Messrs. Knox & Wells, contractors, Cardiff. The architects are Messrs. James & Morgan, Cardiff.

PROPOSED NEW CHURCH, BOLLINGTON CROSS.—It is proposed to erect a new church at Bollington Cross at a cost of not less than 2,500*l*. Mr. Oakley, architect, is to prepare the plans for the work.

NEW SCHOOL AT SELLY OAK.—A new school in Tiverton-road, Selly Oak, was opened on Saturday last week. The building, which was designed by Mr. Edward Holmes, Birmingham, and built by Mr. Harvey Gibbs, King's Heath, is of two stories, the lower having accommodation for 230 infants, and the upper for 280 senior mixed scholars.

CARNEGIE PUBLIC LIBRARY, RUTHERGLEN.—On the 4th inst. the memorial-stone of this institution was laid. The new building, which is situated in Main-street, extends in depth to King-street. The outside walls are built of white stone from Bannockburn with stone and granite pillars. The accommodation on the ground floor consists of an entrance-hall, lending library, with cases, etc., for 20,000 volumes; newspaper-room, ladies' reading-room, with accommodation for forty readers; librarian's room, and general reading-room, with accommodation for 200 readers; lavatories, store-room, etc. A stair leads from the entrance-hall to the first floor of the front building, which contains a small hall, retiring-rooms, and a large committee-room. On the second or top floor is situated the librarian's house, which has a separate stair and entrance from Main-street. A store for books, also a heating chamber, is provided in the basement fronting King-street. Each of the principal apartments will have decorative plastic ceilings, and the lower walls panelled with wood. The building, which is the gift to the burgh by Dr. Carnegie, will cost about 7,000*l*. The contractors, etc., are:—Mason and brick work, John Park & Son; iron and steel work, John Mundy, Glasgow; joiner work, Warnocks & Horsburgh, Rutherglen; slater work, John Scott, Rutherglen; plumber work, Robert Bowie, Rutherglen; plaster work, Wm. Tonner & Sons, Glasgow; heating, etc., James Combe & Sons, Glasgow. The clerk of works is Wm. V. Muir, Rutherglen; and the measurer Andrew Stewart, I.M., Glasgow. The architects are Messrs. Geo. Sinclair and John Ballantine, Glasgow.

NANTYMOEL WORKMEN'S HALL.—On Saturday last week the extensions recently effected at the Nantymoel Workmen's Hall were opened. The hall itself has been extended so as to accommodate over a thousand people, and at the rear a billiard-room, and reading, lecture, and committee rooms have been constructed. The cost of the extensions has amounted to 2,300*l*. The contractor was Mr. D. W. Davies, and the architect Mr. Morris Williams, Blackmill.

ENLARGEMENT OF CONVALESCENT HOME, HORSFORTH.—The Springfield Convalescent Home, near Horsforth, is now being enlarged. Messrs. Walter A. Hobson & So., of Leeds, are the architects of the work, their designs having been accepted in open competition.

Stained Glass & Decoration.

WINDOW, WADDESDON CHURCH, AYLESBURY.—The east window at this church has just been filled with stained glass; it contains three lights and tracery. Our Lord in majesty is represented in the upper part of the centre light, with the figure of S. Michael under, while in the left light at the top is the Virgin Mary and S. John with David and Isaiah underneath, the right hand light having S. Joseph and S. Mary Magdalene in the top part and S. Peter and S. Paul below them. Angels are shown in the tracery. This work was designed and executed by Percy Bacon and Brothers, of London and Edinburgh, under the supervision of the architect, Mr. G. H. Fellowes Prynne.

MEMORIAL WINDOWS, HASELEY CHURCH, OXON.—The gift of two stained glass windows has been made to the parish church of Great Haseley, Oxon. That in the south aisle has for its subject the Transfiguration. The other window, in the north aisle, represents the Dove and the Chalice, the lower part of the window being filled in with our Lord's commission to St. Peter. The designs are by Mr. G. F. Bodley, R.A., and the work by Messrs. Burlison & Grylls.

Sanitary and Engineering News.

WATER SUPPLY FOR CARLISLE.—The new gravitation scheme carried out by Messrs. Mansergh, of Westminster, provides a supply from the Gelt watershed, the water being conveyed to a service reservoir with a capacity of 5,000,000 gallons at Cumwhinton.

DRAINAGE WORK IN POPLAR.—The Medical Officer of Health for Poplar in his annual report which has just been issued says that it has been found to work well in practice to enforce a rule that where water-closet pans and traps are fixed without notice being given under clause 14 of the London County Council By-laws, sect. 39 (1) of the Public Health, London, Act, 1891, the builder is written to, asking him to open the ground, otherwise the matter will be reported to the Public Health and Housing Committee in order that legal proceedings may be instituted against him for infringing the by-law. This mode of procedure prevents good work being constructed on to defective work. Whenever drainage work has been found to have been done and covered up without inspection, if the builder will not open the ground, the work is exposed by the sanitary authority, and such a line of action ensures sound work. For fixing in pans and traps without giving the proper notice three builders were threatened with legal proceedings during the year.

Foreign.

FRANCE.—M. Georges Berger, the President of the Union Centrale des Arts Decoratifs, is organising at the Pavillon Marsan a new series of rooms which will allow of the exhibition of numerous objects for which hitherto there has been no space. At the same time the rooms are being arranged which are to receive the collection which M. Moreau Nélaton has presented to the Government, and which will be open to the public on the 1st January next year.——The statue of Rude, by M. Frémiet, which was in this year's Salon, has been inaugurated at the Tuileries.——The Emery Museum is shortly to be opened to the public. This museum, consisting of a collection of objects of Oriental art brought together by the late M. Emery, will occupy a house in the Avenue du Bois de Boulogne, left by M. Emery for that purpose.——A monument to Gustave Larroumet, the eminent art-critic and former Secretary to the Académie des Beaux-Arts, has been placed under the arcades of the Théâtre Français. It is the joint work of M. Paul Roussel (sculptor) and M. Patouillard (architect).——A monument to Fragonard is to be erected in the gardens of the Louvre. Another monument to this eminent painter is to be erected at Grasse, his native town.——The Municipality of Paris have opened a competition for tenders for the work necessary for carrying the Metropolitan line No. 8 between the Pont des Invalides and the Pont de la Concorde.——The jury of the Ecole de Beaux-Arts charged with the award in the competition in construction, have given the first medal, as well as the Prix Jay, to M. Plisson, pupil of M. Bernier.——A wealthy collector, M. Duhamel, has presented to the town of Mantes the museum which he had built there, as well as his large collection of works of art.——The Government has founded a district school of architecture at Lyons.——The Municipality of Nancy have opened a competition for the building and fitting up of a tuberculosis hospital in that town.——Important works have been carried out at Marseilles for the deepening of the "bassin national," by the side of the moles, at a cost of 1,600,000 francs.——The jury in the competition opened by the Municipality of Moulins (Allier) for the construction of barracks for gendarmes, have awarded the first premium to MM. Giraud and Mazon, of Montluçon.——The statue of Charles Floquet, former President of the Chamber of Deputies, is to be erected at Paris on the open space adjoining the Avenue de la Republique and the Quai Valmy.

GERMANY.—Whereas out of 900 members who attended the Architectural Congress in Madrid, sixty were Germans, out of 1,700 who attended the late Congress in London only ninety came from Germany. In order to ensure success, the Royal Institute of British Architects made the most complete arrangements with the most unsparing devotion. Some disappointment, however, was occasioned by meetings being held simultaneously in two separate buildings, so that it was impossible for those who were so disposed to take part in every meeting. The English custom of distributing printed copies of the paper under discussion greatly facilitates matters and should be adopted by future congresses.——A strong argument in favour of substituting small paving cubes for macadam lies in the greater durability of the former. One of the most frequented streets of Hamburg, the Alsterkrugchaussee, formerly renewed its macadam twice in three years. In 1902 this street was paved with small granite cubes and is as perfect to-day as when it was freshly laid, having cost nothing in upkeep. Added to this, in comparison with macadam, paving stones produce neither dust nor mud. As for noiselessness, small paving cubes rank after asphalt pavement. For traffic they are just as safe as any other form of paving adopted and can be used on slopes of 1 in 20.——An interesting inquiry reveals the fact that in towns the number of houses occupied by a single family varies in the inverse ratio to the number of inhabitants in the town. Thus in Paris, Vienna, Berlin, these houses average 15 per cent., while in towns of under 2,000 inhabitants they average 63 per cent.

AUSTRIA.—Although Vienna already possesses a far larger proportion of open spaces than does London, Paris, or Berlin, a project is being set on foot to preserve the forests and meadow-land surrounding the town, so that fresh air will be readily supplied and the inhabitants will have open country in their immediate vicinity. By this means the open spaces of Vienna will be increased five-fold.——As the XIVth century Town Hall of Görz no longer meets modern requirements, it has been decided to build a new town hall and to leave the ancient palace in its present condition.——The conductor of the choir of St. Stephen's, Vienna, left 1½ million knone for the erection of a children's hospital in Vienna. Herr Josef Schmalzhofer has just completed the plans for the building, which can accommodate from thirty to fifty beds.——Engineer Löwit suggests a means for the preservation of telegraph posts at the place where they usually rot, *i.e.*, at the ground level. He proposes surrounding the post for a height of 1 ft. above and 1 ft. below ground with a socket made in two half rings, the space between post and socket to be run with cement, weathered at the top. This method could be easily and cheaply applied to existing posts.

ITALY.—On August 1 express trains began to use the electric engines on the Simplon line. Fifteen trains daily are drawn through the tunnel by electric power, but the two periodical trains *de luxe* keep to steam in order to avoid loss of time in changing engines.

Miscellaneous.

BRICKMAKING, ETC., IN GERMANY.—In the course of a memorandum on German ceramic industries, Sir William Ward, British Consul-General, states that the extent of German industry and trade in the various descriptions of ceramic ware, including bricks, etc., has largely increased during the past thirty years, and appears likely to develop further in the near future. One or other branch of ceramic industry is now to be met with in almost every part of Germany. Common clays which can be utilised for brick-making, and also those which can be used for the manufacture of common earthenware goods, are of frequent occurrence. The rather superior kinds, and amongst them those which turn white after burning, are likewise not unfrequent. The

total number of brick-making works in Germany, according to the last official census, was 16,431, and the total number of hands employed therein, 219,860. The brick-making, in view of the widespread presence of clay deposits in all parts of the country which are suitable for this industry, is carried on all over Germany, excepting, of course, in the mountainous regions. Earthenware drain-pipes and other pipes are manufactured chiefly in the district of Bitterfeld, in Saxony, Münsterberg in Silesia, in the Lansitz district, in Rhenish Prussia, in the Palatinate, etc. Stoneware tiles, etc., are made at Annaberg and other centres; fireproof stoneware in Hesse, Silesia, Pomerania, and Saxony; terra-cotta ware in Saxony, Thuringia, and Charlottenburg; and architectural ornaments at Bitterfeld, Charlottenburg, Treves, Offenburg, etc. Besides the well-known porcelain works belonging respectively to the governments of Saxony and Prussia at Meissen and Berlin and Charlottenburg, there are at present about 200 private porcelain factories in the country, in addition to more than 1,000 other establishments occupied in painting, colouring, gilding, and otherwise "finishing" porcelain ware. The principal ceramic products exported to the United Kingdom are unglazed fireproof bricks, glazed roofing tiles and bricks, earthenware stoves, and porcelain and wares resembling porcelain. On the other hand, Germany imported from England in 1904 some 37,000 cwt. of ordinary bricks and roofing tiles, 253,998 cwt. of fireproof bricks, not glazed, and 14,210 cwt. of earthenware pipes, glazed.

REBUILDING OF SAN FRANCISCO.—In the opinion of the German trade expert in New York building materials, etc., imported from abroad will not enter very largely into the rebuilding of San Francisco. In the same way as the President of the United States refused the monetary assistance proffered from abroad, Congress will refuse to exempt building material from import duty. The demand for constructional material, girders, angles, etc., will not be so great as was at first estimated. The rebuilding operations will cover several years, and supplies will only be required to be brought forward in instalments, which the iron and steel industry at home will be able to furnish without difficulty. The more immediate needs, viz., for corrugated iron, wire, and nails, etc., for temporary structures, have already been to a large extent satisfied by American concerns. Perhaps a more active demand for fireproof roof and wall coverings and for impregnating material for wood will arise and bring with it a better chance for the importer. Cement is likely to continue to meet with a ready sale. Experience of the after-effects of the Baltimore fire has shown that neither in building materials nor in dry goods is trade likely to become abnormally active.—*Board of Trade Journal.*

ST. MARK'S, VENICE.—Under the superintendence of Signor Manfredi, the architect, and Signor Marangoni, the engineer, the restoration of the Basilica is well advanced. The two vaults of the roof, known as the Apocalypse and Paradise, are securely propped. The Tribune of the Patriarch has also been propped, and the Byzantine mosaics have been carefully detached.

EXHIBITION OF LIVERPOOL ART.—A Committee is formed of members of the Liverpool Academy of Arts and the Corporation for an historical exhibition of Liverpool art in the Walker Art Gallery in the course of next May. The exhibits will consist mainly of works of art by members of the Liverpool Academy and of the former societies of the XVIIIth century and by other Liverpool artists, and will comprise portraits of Liverpool artists. The committee will be glad to be informed as to the ownership of the works in question and to receive copies of old Liverpool Academy catalogues. All communications should be addressed to Mr. E. Rimbault Dibdin, the secretary, at the Walker Art Gallery, Liverpool.

RAILWAY FROM MUNDESLEY TO RUNTON.—A joint committee of the Great Northern, Midland, and Great Eastern Railway Companies have opened an extension of the North Walsham and Mundesley line, for a distance of nine miles, with stations at Trimingham and Overstrand, near Cromer. A tunnel 180 ft. long passes beneath the Norwich and Cromer line of the Great Eastern Railway; it was constructed upon the "cut and cover" principle, and without hindrance to the traffic on the line above. Communication by railway is thus made with Sheringham, and a short branch at Runton extends to the station at Cromer.

Capital and Labour.

CONDITION OF THE BUILDING TRADES.—Employment on the whole continued dull, though it was slightly better than a month ago. Compared with a year ago it showed little change. In London employment was rather better than a month ago, but it was not so good as in July, 1905. Returns received through the Trade Correspondent from 57 London Employers show that in the last week of July, 9,993 workpeople of all classes were paid wages, as compared with 9,556 in June, and 11,441 in July, 1905. Trade Union returns relating to carpenters and joiners show that the percentage of unemployed in July was 7·8, as compared with 9·4 a month ago, and 7·9 a year ago. With plumbers the percentage for July was 14·3, for June 13·7, and for July, 1905, 11·1. In both trades the percentage of unemployed was higher in London than in any other district. With bricklayers and plasterers employment was rather better than in the previous month; with masons a considerable improvement was shown, though employment continued dull, and with painters little change was shown. Returns received from 72 employers' associations in towns outside London show that employment in these towns continued quiet, and on the whole rather worse than a year ago. The following information is based on returns received from the general secretaries of Trade Unions and from Trade Union reports:—Employment with bricklayers and masons was dull on the whole, but somewhat better than a month ago. With carpenters and joiners it continued slack, but was slightly better than a month ago and a year ago. The percentage unemployed of Trade Union carpenters and joiners in the whole country was 5·3, compared with 5·4 in June, and 6·5 in July, 1905. With plumbers it was rather worse than a month ago, but better than a year ago. The percentage of Trade Union plumbers unemployed was 8·9 in July, as compared with 7·9 in June and 10·1 in July, 1905. With slaters, painters, and builders' labourers there was a falling-off in employment as compared with a month ago. With plasterers there was a slight improvement.—*Labour Gazette.*

Patents of the Week.

APPLICATIONS PUBLISHED.*

14,908 of 1905.—A. JOHNSON: *Manufacture of Lavatory Basins and the like made of Earthenware.*

This relates to the manufacture of lavatory basins and other articles of earthenware requiring to be similarly produced, consisting in adding to and mixing with the clay or clay mixture of which the said articles are to be made, of a solution or mixture of soda, water, and glass, then running the combined mixtures into a mould, and allowing them to stand until the clay is set hard.

15,112 of 1905.—C. HELAS: *Valve Attachments for Water Heaters and the like.*

This relates to valve attachments for water heaters and the like, and consists in the construction of two vertical valves, one for gas, and the other for water, connected together by vertical rods, the said rods being jointed, and connected together by a set pin passing through the head of the vertical rod of the gas valve and through slots cut in the tail end of the vertical rod of the water valve. The water valve is situated at the top and the gas valve at the bottom of the apparatus.

18,324 of 1905.—D. A. REAGAN: *Devices for Automatically Operating Fire Doors.*

This relates to a device for automatically operating fire doors, and consists of a motor comprising a casing, a piston in the casing, an inlet port, an exhaust port, an oscillatory valve adapted to contain live steam and carry from the inlet port to a discharge orifice in the front of the piston, a cut-off rod and tappets controlled by said cut-off rod for returning the valve to its original position, one of the said tappets being moved by the piston, and connexions between the fire door and the motor whereby the fire door is automatically opened at intervals and permitted to close by gravity.

21,832 of 1905.—C. S. JOSEPH: *Fire Grates.*

This relates to a twin grate adapted to be built into the division wall of two rooms and to heat directly by means of a common fire either room separately or both rooms simultaneously. The two fire grates abut rearwardly, a vertically movable central damper or partition being adapted to cut off communication between them, either partially or completely.

24,447 of 1905.—D. CROWTHER: *Domestic Fire Places.*

This relates to domestic fire places and consists of a fire-clay slab or iron plate, supported by means of four link chains attached respectively to the four corners of the slab or plate from a pair of hooks secured to the fire back, so that by lengthening and shortening the chain connexions the slab or plate can be supported at any desired height and at any desired forward inclination against the fire back.

5,551 of 1906.—J. T. STOKES: *Radiators for Heating Plates.*

This relates to radiators for heating buildings, and consists of a perforated cap for containing the water evaporating vessel, such cap having supporting brackets projecting inwards from its interior sides, means by which said cap is fastened in position, said means consisting of inward projections on opposite sides of said cap arranged to engage with the radiator members, or with a pivoted balanced catch attached thereto.

8,863 of 1906.—R. MOHR: *Windows.*

This relates to a window which comprises a casing having a pocket or channel in the top, a screen frame slidable within said pocket, said screen frame resting normally upon and moving with the sash, an elastic latch adapted to engage and lock the screen within its pocket when the upper sash is closed, and a lug or projection carried by the upper rail of the lower sash so as to engage such spring and release the screen when the lower sash is raised for the purpose.

9,074 of 1906.—F. C. SCHWEDTMAN: *Sash and other like Weights.*

This relates to a weight composed of a core of ground barytes, and a bonding agent surrounded by a shell of metal which fills the surface pores of said core.

11,390 of 1906.—F. C. VON BRUCH: *Locks for Doors.*

This relates to a door lock having a latch operated by a forcing arm and a spring acting on two or more lock parts, and is characterised by one arm of the spring which is made of steel wire and wound one or more complete turns round the fixed pin, being formed into a closed loop by bending over and securing the end or extension of the wire in or to the pin, thus obtaining increased resilience.

13,249 of 1906.—W. H. TONKS: *Emergency Exit Fastenings or Panic Bolts for Doors and Windows.*

This relates to the combination with emergency exit fastenings or panic bolts, of springs or spring mechanisms for ensuring the parts taking up a self-locking position when the bolts are fastened and for assisting or effecting a positive release of the bolts on the unfastening of the same.

16,011 of 1905.—W. FRETWELL: *An Adjustable Junction and Tee Piece for Waste Soil and other Pipes.*

This relates to an adjustable junction and tee piece for waste, soil, and other pipes, whereby the branch or branches may be fixed at any desired angle, at the same time permitting expansion to take place in the branch connexion. An alignment of the waste pipe and junction is attained by forming a rebate in the ends of said junction into which the tubes may be screwed. The rotating branch connexion is made to receive various tubes or fittings as desired, which are screwed, caulked, or soldered, the junction itself being made for screwed sockets and other pipes.

16,254 of 1905.—A. G. GRICE and G. ANDERSON & CO., LTD.: *Stone Sawing Machinery.*

This relates to stone sawing machinery and consists in the combination of a cross frame which can be raised or lowered by vertical screws operated by a driving shaft, cross shafts, belt, wheels, and pinions with two or more rotating adjustable saws and of two or more reciprocating tables.

19,108 of 1905.—E. MATHIS: *Coatings for Floors, Roads, and the like and in the preparation thereof.*

This relates to a method of preparing floor or road coverings, which consists in mixing shale or its equivalent with an equal or less quantity of tar or tar residues, the whole being boiled and stirred together with or without the addition of lime or other neutralising agent, to form a mass of uniform consistency which when applied to the surface to be covered is rammed hard and smoothed.

21,919 of 1905.—T. E. DEVONSHIRE: *Construction of Floors and Ceilings.*

This relates to the construction of combined floors and ceilings by the use of temporary supports for making the permanent supports *in situ*, and consists in the employment of previously made blocks having undercut projections on the ends such that when the material of the permanent support is introduced and set it will form a keyed connexion with the said blocks.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

Aug. 3.—By PAXTON & HOLIDAY (at Bicester).

Twyford, Bucks.—The Poundon Estate, 851 a. 3 r. 15 p., f.	£24,200
Marsh Gibbon-rd., three freehold enclosures, 24 a. 3 r. 11 p.	625
Charndon, Bucks.—Freehold farm and enclosures, 126 a. 0 r. 34 p.	2,885
The Roebuck Inn, f.	725

Aug. 9.—By WYATT & SON (at Selsey).

Selsey, Sussex.—High-st., freehold business premises and house, p.	1,250
High-st., freehold premises with farm buildings adjoining, area, 1 a. 0 r. 24 p., p.	260

Aug. 10.—By MADDISON, MILES, & MADDISON (at Diss).

Burston, Norfolk.—Freehold holding, 8 acres	220
Diss, Norfolk.—Mount-st., five freehold houses	240

SALES OF PROPERTY.—*Continued on page 268.*

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments, xvii.; Auction Sales, xxviii.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

Contracts.

BUILDING.

AUGUST 27.—**Knotty Ash.**—LAUNDRY BUILDINGS.—Liverpool Select Vestry invite tenders for the erection, at Highfield Infirmary, Knotty Ash, of laundry buildings, according to plans and specifications, to be seen at the office of the architects (Mr. Edmund Kirby & Mr. W. E. Willink), 5, Cook-street, Liverpool, between the hours of 10 o'clock a.m. and 5 o'clock p.m. Bills of quantities, conditions of contract, and forms of tender (upon which alone offers will be received) may be obtained at 5, Cook-street, on payment of a deposit of 2*l.* Sealed tenders must be delivered to Mr. H. J. Hagger, Vestry Clerk, Parish Offices, Brownlow-hill, not later than August 27.

AUGUST 27.—**Leeds.**—SCHOOL ALTERATIONS, ETC.—The whole of the trades required in proposed alterations and additions to Pool School for the managers. Names to Mr. Geo. W. Atkinson, architect, 1, Mark-lane, Leeds, before August 27, after which date quantities will be forwarded.

AUGUST 27—SEPTEMBER 4.—**Maidstone.**—POLICE STATION.—Maidstone Council invite tenders from Maidstone builders for the erection of a police station on land adjoining Mill-street. Applications for bills of quantities and form of tender to be made at the offices of Messrs. Rock & Smith, architects, 86, Week-street, Maidstone (where plans and specification may be seen), on or before August 27, after which date no application can be entertained. A copy of the quantities and form of tender will be supplied to those who have made application in exchange for 2*l.* 2*s.* Sealed tenders, which will only be received on the form supplied, to be sent to office of Mr. S. Lance Monckton, Town Clerk, Town Clerk's Office, King-street, Maidstone, endorsed "Tender for new Police Station," on or before noon on September 4.

AUGUST 27.—**Middlewich.**—ALTERATIONS TO PREMISES.—Winsford Industrial Co-operative Society, Ltd., Committee invite tenders for alterations and extensions at No. 2 Branch, Lewin-street, Middlewich. Plans and specifications may be seen at the branch in Middlewich. Tenders, endorsed "Branch Alterations," to be sent in to Mr. William Fryer, Secretary, not later than 12 noon on August 27.

AUGUST 27.—**Newcastle-on-Tyne.**—ALTERATIONS TO CONVENIENCES.—Newcastle-upon-Tyne Finance Committee invite tenders for alterations to conveniences in the Vegetable Market. Names to the City Property Surveyor, Town Hall, Newcastle-on-Tyne, on or before August 27. Mr. Hill Motum, Town Clerk, Town Hall, Newcastle-upon-Tyne.

AUGUST 28.—**Chertsey.**—BALCONY AND STAIRCASE.—A balcony at the old infirmary, Union Workhouse, Ottershaw, Chertsey. Also for an iron staircase at the infirmary. Plans and specification can be seen at the Union Workhouse, Ottershaw, Chertsey, between the hours of 10 a.m. and 5 p.m. Sealed tenders must be sent to office of Mr. H. E. Paine, Clerk, 80, Guildford-street, Chertsey, not later than 9.30 a.m. on August 28.

AUGUST 29.—**Crosland Moor.**—HOUSE.—The erection of a dwelling-house in Park-road, Crosland Moor. Plans may be seen, and bills of quantities obtained, at office of Mr. J. Berry, architect and surveyor, 3, Market-place, Huddersfield. Tenders to be delivered not later than August 29.

AUGUST 29.—**Glasgow.**—TRAMWAY DEPOT ALTERATION.—Glasgow Corporation invite offers for the work in connexion with proposed alterations to Whitevale Depôt. The whole work will be let in one contract, and includes brick, cast-iron and steel, carpenter and joiner, slater, plumber, and painter works. Each offerer must submit, along with his tender, a list of the sub-contractors he would propose to employ. Plans can be seen, and forms of tender obtained, on application to Mr. James Dalrymple, General Manager, 46, Bath-street, Glasgow. Tenders, marked "Tramways—Tender for Alterations to Whitevale Depôt," must be lodged with Mr. A. W. Myles, Town Clerk, City Chambers, Glasgow, not later than 10 a.m. on August 29.

AUGUST 30.—**Chopwell.**—COTTAGES.—The Consett Iron Company, Ltd., invite tenders for the erection of forty cottages at Chopwell. Plans and specifications may be seen, and quantities obtained, upon application to the company's architect (Mr. Charles E. Oliver) at the General Offices of the company, at Consett. Tenders, addressed to the Consett Iron Company, Ltd., Consett, and endorsed "Tender for Cottages," must be delivered before noon on August 30.

AUGUST 30.—**Lissan.**—CHURCH.—A new Catholic Church at Lissan, Cookstown, Co. Tyrone, for the Very Rev. B. O'Connor, P.P., according to the plans and specification prepared by Messrs. Ashlin & Coleman, architects, 7, Dawson-street, Dublin. Bills of quantities have been prepared by Mr. D. W. Morris, surveyor, 68, Harcourt-street, Dublin, and can be obtained from him on payment of 1*l.* 1*s.* The plans and specification can be inspected at the architect's offices, and at the Presbytery, Lissan. Sealed tenders, addressed to the architects, to be delivered at the architect's offices not later than 12 o'clock noon on August 30.

AUGUST 31.—**Cwm.**—FIRE STATION.—Ebbw Vale U.D.C. invite tenders for erecting a fire station at Cwm. Plan and specification may be seen, and form of tender, with bill of quantities, obtained, by appointment at the office of Mr. T. J. Thomas, Town Surveyor. A deposit of 10*s.*, which must be in postal orders, will be required from each person who obtains a copy of the form of tender. Tender, enclosed in a sealed envelope, endorsed on the outside "Tender for Fire Station at Cwm," should be delivered at office of Mr. Tho. Hughes, Clerk, Ebbw Vale, not later than August 31.

AUGUST 31.—**Mirfield.**—ALTERATIONS, ETC., TO SCHOOL.—Alterations and additions to Mirfield Grammar School. Plans and specifications seen, and bills of quantities obtained, at the office of the architect, Mr. J. Lane Fox, No. 4, Oxford-place, Leeds, until August 31, on which latter date sealed tenders are to be sent in not later than 4 p.m., addressed to Mr. G. Topham, solicitor, Mirfield.

SEPTEMBER 1.—**Newchurch (I. of W.).**—ALTERATIONS AND REPAIRS.—The Isle of Wight County Education Committee invite tenders for alterations and repairs at the Newchurch Council School. Specifications may be seen at the County Education Offices, Newport, I.W., or at the office of the architect, 5, St. Thomas's-street, Ryde, where all information may be obtained. Sealed tenders, endorsed "Newchurch School," must reach Mr. F. G. Flux, Secretary, County Education Offices, Newport, I.W., not later than 9 a.m. on September 1.

SEPTEMBER 1.—**Rhosneigr.**—HOUSE, SHOP, ETC.—For construction and completion of house, shop, and bakehouse at Rhosneigr, for Messrs. Evans & Co., Chester House, Holyhead. Plans and specifications may be seen at Chester House, London-road, Holyhead, where the contractor must take his own quantities. Tenders to be in by September 1.

SEPTEMBER 3.—**Dartmouth.**—REBUILDING INN.—For the demolition and rebuilding of the Globe Inn, South Embankment, Dartmouth, for Messrs. J. Bartlett & Co. Persons desirous of submitting an estimate are requested to send their names to Mr. R. Montague Luke, civil engineer, 15, Princess-square, Plymouth, at whose offices drawings, conditions, and specifications may be seen, and further information obtained. Sealed tenders, endorsed "Tender for Globe Inn," must be delivered to Mr. Luke not later than September 3.

SEPTEMBER 4.—**Blackrock.**—WORK AT TOWN HALL.—The U.D.C. of Blackrock invite tenders for the following works in connexion with the new assembly room, Town Hall, Blackrock:—(*a*) Overhauling and repairing roof; (*b*) erection of gas fittings; (*c*) extension of present ceiling; (*d*) relaying of present floor; (*e*) decorating and painting walls, etc. Specifications can be seen, and full particulars obtained, at the Surveyor's Office, Town Hall, Blackrock. Tenders (which are to be on prescribed forms) must be lodged with Mr. R. Finlay Heron, Town Clerk, Town Hall, Blackrock, County Dublin, on or before 4 o'clock p.m. on September 4.

* SEPTEMBER 5.—**Brentwood.**—FITTING-UP SPRAY BATHS.—The Metropolitan Asylums Board invite tenders for fitting-up spray baths, etc, at High Wood School, Brentwood, Essex, in accordance with drawing, specification, and conditions of contract, prepared by Mr W. T. Hatch, Engineer-in-Chief. Drawing, specification, conditions of contract, and form of tender may be inspected at the office of the Board, Embankment, E.C., on and after August 24, and can then be obtained upon deposit of 1*l.* Tenders, addressed as noted on the form, must be delivered at the office of the Board before 10 a.m., September 5.

SEPTEMBER 5.—**Thornley.**—HOUSES.—The Weardale Steel, Coal, and Coke Company, Ltd., invite tenders for the erection of one hundred (100) workmen's dwelling-houses between Thornley and Wheatley Hill. Plans and specifications can be seen at Thornley Colliery Office from August 27 to August 31, both dates inclusive. Tenders to be marked "New Houses," and addressed to the Company, Thornley Colliery Office, Thornley, R.S.O., by September 5.

SEPTEMBER 7.—**Aylmerton and Southery.**—SCHOOL WORKS.—For the enlargement of Aylmerton School. Plans and specifications can be seen, and bills of quantities obtained, at the office of Mr. A. F. Scott, architect, Castle Meadow, Norwich. Also for the erection of a new range of offices, drainage, and other works at Southery School. Plans and specifications can be seen, and bills of quantities obtained, at the office of Mr. H. J. Green, architect, Castle Meadow, Norwich, and Paradise Chambers, King's Lynn. A deposit of 1*l.* 1*s.* will be required in each case. Tenders must be delivered by 12 noon on September 7, addressed to "The Secretary, Norfolk Education Committee, 57, London-street, Norwich," and endorsed "Tender for Aylmerton School or Southery School."

SEPTEMBER 7.—**Filby, Lessingham, etc.**—SCHOOL WORKS.—For the enlargement of Filby School, and for the erection of a teacher's dwelling-house. Plans and specifications to be seen, and bills of quantities obtained, at the office of Mr. T. Inglis Goldie, architect, Bank Plain, Norwich. Also for alterations and improvements at Lessingham School, Winterton School, and at Stalham School. Plans and specifications can be seen, and bills of quantities obtained, at the office of Messrs Olley & Haward, architects, Queen-street, Great Yarmouth. A deposit of 1*l.* 1*s.* will be required in each case. Tenders must be delivered by 12 noon on September 7, addressed to "The Secretary, Norfolk Education Committee, 57, London-street, Norwich," and endorsed "Tender for Filby School, Lessingham School, Winterton School, or Stalham School."

* SEPTEMBER 7.—**Stockport.**—STABLES, ETC.—The Guardians of the Stockport Union invite tenders for stables and coach-house, etc., at the Stepping Hill Hospital, Hazel-grove, near Stockport, in accordance with plans and specification, etc., prepared by Mr. W. H. Ward, architect, Paradise-street, Birmingham. Plans and specification may be seen at the Union Offices, Stockport, or upon application to Mr. Ward. Forms of tender, with copies of bills of quantities, will be sent to contractors upon application to Mr C. F. Johnson, Clerk to the Guardians, Union Offices, Stockport, enclosing cheque for 2*l.* 2*s.* Sealed tenders to be sent to Mr. Johnson before 10 a.m., September 7.

SEPTEMBER 8.—**Derby.**—SCHOOL.—Derby Education Committee invite tenders for the erection of a new school on a site between Clarence and Porter Roads. Plans, etc., may be seen, and schedules of quantities obtained, on application to Messrs. Hunter & Woodhouse, All Saints' Chambers, Iron-gate, Derby. The sum of 1*l.* 1*s.* will be charged for the schedule of quantities. Tenders, on the form supplied, together with the priced schedule of quantities, must be delivered at the Education Offices, Becket-street, Derby, before 12 o'clock at noon on September 8, endorsed "Tender for New School on Clarence-road." Tenders will be accepted from Derby firms only.

SEPTEMBER 10.—**Bury St. Edmund's.**—SCHOOL ALTERATIONS, ETC.—The West Suffolk Education Committee invite tenders for alterations and additions to the County School, Northgate-street, Bury St. Edmund's. Plans and specification can be seen at the Education Offices, 5, Crown-street, Bury St. Edmund's, or at the offices of the County Architect (Mr. A. Ainsworth Hunt, Sudbury and Bury St. Edmund's). Tenders (sealed and endorsed) to be delivered to Mr. Fred. R. Hughes, Secretary to the Education Committee, 5, Crown-street, Bury St. Edmund's, on or before September 10.

* SEPTEMBER 13.—**Chartham Hatch.**—SCHOOL ENLARGEMENT.—The Kent Education Committee invite tenders for the alteration and enlargement of the Council School at Chartham Hatch, near Canterbury, Kent. Drawings and specification may be inspected at the office of the architect, Mr. W. J. Jennings, 4, St. Margaret's-street, Canterbury. Copy of the bills of quantities may be obtained on application to the architect, with deposit of 1*l.*, not later than noon, September 4. Tenders, on the form supplied, to be delivered to Mr. F. S. Cloke, Sandwich, Kent, before noon, September 13.

SEPTEMBER 17.—**Willowtown.**—SCHOOLS.—Ebbw Vale Education Committee invite tenders for the erection of new schools for boys, girls, and infants, together with cookery and manual instruction rooms, at Willowtown, Ebbw Vale. Plans, specifications, and conditions of contract may be seen at the office of the architect, Mr. Henry Waters Waungoch, Beaufort. Personal application must be made to the architect for the bills of quantities, accompanied by a deposit of 3*l.* 3*s.* Separate tenders are required for (1) the infants' block, (2) mixed block, (3) cookery and manual block, (4) the remainder of the works, and (5) the whole of the works. Tenders, enclosed in a sealed envelope, endorsed on the outside "Tender for Willowtown Schools," should be delivered at office of Mr. Tho. Hughes, Secretary, Ebbw Vale, on or before September 17.

* SEPTEMBER 27.—**Whitechapel.**—ALTERATIONS.—The Council of the Metropolitan Borough of Stepney invite tenders for certain additions and alterations in the building at their electricity works, Osborn-street, Whitechapel, E. The drawings may be seen, and copies of the stipulations, specifications, schedule, and form of tender may be obtained of the Borough Engineer, Mr. M. W. Jameson, at 15, Gt. Alie-street, Whitechapel, E., on and after August 13, between 10 and 12, on deposit of 5*l.* Tenders, endorsed "Tender for Additions to Electricity Buildings," should be sent to Mr. G. W. Clarke, Town Clerk, 15, Gt. Alie-street, Whitechapel, E., in the envelopes supplied, before 12 noon, September 27.

NO DATE.—**Adwalton.**—REPAIRS.—For mason's and bricklayer's repairs to property at Adwalton. Apply to Messrs. J. Fox & Son, architects, Town Hall Chambers, Leeds.

NO DATE.—**Bradford.**—WAREHOUSE.—The various works, including ironwork, required for the erection of a warehouse in Canal-road, Bradford. For quantities apply Messrs. Samuel Jackson & Son, architects and valuers, 11, Tanfield-chambers, Bradford.

NO DATE.—**Kendal.**—SUNDAY SCHOOL.—For the whole or separate portions of the artificers' work required in building an infants' Sunday school, in Highgate, Kendal, for the Trustees of Zion Chapel. Plans can now be inspected, and names of intending contractors for bills of quantities received, at office of Mr. John Hutton, M.R.S.I., architect, Kendal. Tenders to be sent in to me on the date specified on bills of quantities.

NO DATE.—**Letheringham.**—CHURCH IMPROVEMENTS.—The Vicar is prepared to receive tenders for the improvement of Letheringham Church. For particulars, apply, Vicar, Charsfield.

ENGINEERING, IRON, AND STEEL.

AUGUST 28.—**Belfast.**—LAUNDRY MACHINERY.—Belfast Guardians invite proposals for supplying and fitting-up machinery at the new central laundry at this Union Workhouse, in accordance with plan and specification prepared by Messrs. Young & Mackenzie, civil engineers, which can be seen at office of Mr. Joseph W. Robb, Clerk of the Union, Clerk's Office, Union Workhouse. Copies of specification and schedule can be obtained on application at office of Clerk. Tenders, endorsed "Laundry Machinery," to be lodged in the tender-box, board-room, before 12 o'clock noon on August 28.

AUGUST 28.—**London.**—PIPE.—Lambeth Guardians invite tenders for the providing and fixing of about 170 yds. of 3-in. to 5-in. steam pipe, with valves and accessories, at their Workhouse, Renfrew-road, Lower Kennington-lane, S.E. Specification and form of tender can be obtained from the Consulting Engineer to the Guardians, Mr. George E. Arnold, 195, Kennington-road, S.E., and form of contract can be seen at that address. Tenders must be sent by post not later than August 28 to Mr. W. Thurnall, Clerk to the Guardians, Guardians' Board-room and Offices, Brook-street, Kennington-road, S.E., sealed and superscribed "Tender for Steam Pipes."

AUGUST 30.—**Bolton.**—SWITCHBOARD.—Bolton Electricity Committee invite tenders for extensions to a three-phase extra high-tension switchboard at the generating station, Spa-road, Bolton. Specification and form of tender may be obtained on application to Mr. Arthur A. Day, A.M.I.C.E., M.I.E.E., Borough Electrical Engineer, Spa-road, Bolton, on payment of 1*l.* 1s. Tenders, endorsed "Tender for Three-phase Switchboard," must be sent in not later than 12 o'clock noon, August 30, addressed to the Chairman of the Electricity Committee, Town Clerk's Office, Town Hall, Bolton.

AUGUST 30.—**Ventnor.**—SEA WALL.—Ventnor U.D.C. invite tenders for the erection of a sea wall of about 260 ft. in length at Wheeler's Bay, Ventnor. Detailed specification and plans may be seen at the Office of the Town Surveyor, Town Hall, Ventnor, at any time during office hours. Tenders, endorsed "Sea Wall," must be received by Mr. Robert M. Barr, Clerk of the Council, Town Hall, Ventnor, not later than August 30.

AUGUST 31.—**Dundee.**—GIRDERS, ETC.—Dundee Town Council invite tenders for the supply and delivery of about 300 tons of steel girder tramway rails and fixings, also for steel points and crossings. Specifications, schedules, of quantities, and forms of tender may be obtained on application to Mr. Jas. Thomson, Burgh Engineer, Municipal Offices, 91, Commercial-street, Dundee, on payment of 2*l.* 2s. Sealed tenders, endorsed "Rails and Fixings, etc.," must be lodged with Mr. Wm. H. Blyth Martin, Town Clerk, City Chambers, Dundee, not later than August 31.

AUGUST 31.—**Epsom.**—EXTENSIONS TO ELECTRIC LIGHT PLANT.—Epsom U.D.C. Electric Lighting Committee invite tenders for the following plant:—Section 1, to supply and erect one 300 KW. steam dynamo, with accessories, etc.; section 2, to supply and erect, with brickwork setting, one water-tube boiler, etc., together with pipework, etc.; section 3, to supply and erect one surface condenser, capable of dealing with 9,000 lb. of steam, etc.; section 4, to supply one induced draught fan, complete with dampers, frames, etc. Plan of the general arrangements can be inspected at the Engineer's Office, at the Electricity Works, on giving forty-eight hours' notice. Copies of the general conditions, specification, and forms of tender to be obtained from Mr. H. F. Foster, Electrical Engineer to the Council, Electricity Works, Epsom, on payment of 3*l.* 3s., and a charge of 5s. will be made for each additional copy. Tenders are to be upon the printed book forms, sealed and endorsed "Tender for Extensions at the Electricity Works," and are to be addressed to "The Clerk of the U.D.C., Epsom," and to be delivered to him at his office, Duncannon, Church-street, Epsom, on or before 12 o'clock noon on August 31.

AUGUST 31.—**Hoel-y-Glo.**—BRIDGE.—The Urban Council for the district of Margam are prepared to receive tenders for the construction of an iron girder bridge, with stone abutments and approaches. Plans and specification may be seen by appointment with the Surveyor to the Council, Mr. John Cox, Port Talbot, on payment of a deposit of 1*l.* 1s. Tenders to be delivered to Mr. D. E. Jones, solicitor, Clerk to the Council, Port Talbot, not later than August 31, sealed and endorsed "Tender for Hoel-y-Glo Bridge."

SEPTEMBER 1.—**Glasgow.**—BRIDGE.—Glasgow Corporation invite tenders for (1) the mason work and (2) the steelwork required in connexion with the widening of Keppochhill-road Bridge over the North British Railway. Specifications and forms of tender may be had on application at the Office of Public Works, City Chambers, 64 Cochrane-street. Sealed tenders, marked outside "Tender for Mason Work, Keppochhill-road Bridge," must be lodged with Mr. A. W. Myles, Town Clerk, City Chambers, Glasgow, on or before September 1.

SEPTEMBER 3.—**Southampton.**—RECONSTRUCTION OF PORTION OF BISHOP'S WALTHAM MILL BRIDGE.—Drawings, specification, and conditions of contract can be seen, and bill of quantities obtained, and all other necessary information, on application at the office of Mr. W. J. Taylor, County Surveyor, The Castle, Winchester, between the hours of 9 a.m. and 5 p.m. (Saturdays, 9 a.m. and 1 p.m.). A deposit of 3*l.* 3s. will be required for a copy of the bill of quantities. Deposits must be made by cheque, payable to Hants C.C., and crossed Bank of England, or particulars will not be sent. Tenders, endorsed "Bishop's Waltham Mill Bridge," must be on forms supplied by the County Surveyor, and must be delivered to Mr. H. Barber, Clerk of the C.C., The Castle, Winchester, before 10 o'clock a.m. on September 3.

SEPTEMBER 4.—**Walsall.**—RAILS.—Walsall Corporation invite tenders for the supply of 1,170 tons of steel tramway rails, 6½ in. by 6½ in., of the British Standard Section No. 1, of the weight of 90 lb. to the yard, and in accordance with the specification of the Standardisation Committee. Tenders, endorsed "Tender for Tramway Rails," are to be forwarded to Mr. John R. Cooper, Town Clerk, Council House, Walsall, on or before September 4.

SEPTEMBER 4.—**Widnes.**—BOILERS.—Widnes Corporation invite tenders for two new steel Lancashire boilers, 32 ft. by 8 ft. 6 in., working pressure, 180 lb. Copy of specification and conditions of contract may be had on application to Mr. Isaac Carr, M.Inst.C.E., Widnes. Tenders, endorsed "Steel Boilers," and addressed to the Chairman of the Gas and Water Committee, to be delivered at the Town Hall, Widnes, on or before noon, September 4.

SEPTEMBER 6.—**Bickerstaffe.**—COOLING POND, ETC.—Southport, Birkdale, and West Lancashire Water Board invite tenders for the construction of a cooling pond, filter beds, and other works, to be situate on land belonging to the Board, at or near Royal Oak, in the Parish of Bickerstaffe, about two and a half miles by road from the Town Green and Aughton Station of the Lancashire and Yorkshire Railway. The drawings may be seen on and after August 25, and the specification, forms of tender, and schedule of quantities may be obtained (on payment of 5*l.* 5s.) at the offices of Messrs. H. Rofe & Son, civil engineers, 8, Victoria-street, Westminster, and Oxford Chambers, Victoria-square, Leeds. Copies of the drawings may also be seen, on and after the above date, at the Waterworks Office, Portland-street, Southport. The tenders to be sent in to Mr. Alleyne Brown, Clerk to the Board, 11, St. George's-place, Lord-street, Southport, on or before 10 a.m. on September 6, endorsed "Tender for Cooling Pond, Filter Beds, etc."

SEPTEMBER 8.—**Warrington.**—REPAIRS TO ENGINE.—Warrington Water Committee invite tenders for certain repairs to their 'Water Lily' pumping engine at Winwick Pumping Station. Particulars may be had from Mr. James Deas, A.M.I.C.E., Water Engineer, Municipal Offices. Tenders to be sent in not later than September 8.

SEPTEMBER 10.—**Avonmouth, Bristol.**—DRY DOCK CAISSON.—Bristol Docks Committee invite tenders for the construction, delivery, erecting in place, fitting, testing, and maintenance for twelve months after erection, of a caisson for the dry dock of the Royal Edward Dock, now in course of construction at Avonmouth, in the Port of Bristol. The contract includes electrically-driven pumps and motors in connexion therewith. Copies of the specification, form of tender, form of contract, and copy of contract drawings can be obtained from Mr. W. W. Squire, Engineer, Engineer's Office, Cumberland-road, Bristol, on production of a receipt from the Secretary of the Docks Committee showing that 5*l.* has been paid as deposit. Tenders must be enclosed in a sealed envelope, endorsed "Tender for Dry Dock Caisson," and addressed to the Secretary of the Docks Committee, 19, Queen-square, Bristol, and must be delivered to him, accompanied by the prescribed documents, not later than 10 a.m. on September 10.

SEPTEMBER 11.—**Newcastle-on-Tyne.**—STEEL RAILS, POINTS, AND CROSSINGS.—The Tramways Committee of the Corporation of Newcastle-upon-Tyne invite tenders for the supply of rails, points, and crossings, together with the necessary fishplates, tie-rods, bolts and nuts, in connection with the renewal and extension of a double junction in Northumberland and Blackett streets. Alternative offers are asked for, viz.:—(1) In hardened cast-steel points and crossings and rolled-steel rails; (2) in manganese steel throughout. Plans may be seen, and specifications, schedule of quantities, and form of tender obtained, at the office of the City Engineer, Town Hall, Newcastle-upon-Tyne, on payment of 1*l.* 1s. Tenders endorsed "Tender for Renewal, etc., of Northumberland-street Junction," and addressed to the Chairman of Tramways Committee, to be delivered at the City Engineer's Office on or before September 11.

SEPTEMBER 17.—**Oxford.**—TRAMWAYS.—Oxford Corporation invite tenders for the reconstruction, extension, and electrical equipment of the existing horse tramways in the city and the leasing thereof. Proposals based upon the overhead system of electric tramways will not be considered. The conditions of tender may be obtained from Mr. Richard Bacon, Town Clerk, Town Hall, Oxford, on deposit of Bank of England notes to the value of 100*l.* Tenders must be addressed to the Town Clerk, in sealed packets, endorsed "Tender of Tramways," and delivered at his office in the Town Hall, Oxford, on or before September 17.

NO DATE.—**Knownoblehill.**—RAILWAY.—The United Collieries, Ltd., invite tenders for the construction of a branch railway into pits at Knownoblehill Colliery and sidings thereat. Specifications and forms of tender may be had on application to Messrs. The United Collieries, Ltd., Engineer's Office, 19, Waterloo-street, Glasgow, where plans of the works may also be seen.

NO DATE.—**Swansea.**—SLUICES AND MACHINERY.—The Swansea Harbour Trustees invite tenders for five pairs of main sluices, and ten pairs of supplementary stop paddles, together with hydraulic and hand-power machinery for working them. On and after August 27 drawings may be inspected between 11 a.m. and 4 p.m. at the office of the Trustees' Engineer, Mr. A. O. Schenk, M.Inst.C.E., Harbour Offices, Swansea, and copies of the drawings, specification, conditions and forms of and instructions for tender, may be obtained of Mr. Talfourd Strick, Clerk, Harbour Offices, Swansea, on payment of 5*l.* 5s.

MISCELLANEOUS.

AUGUST 27.—**Southwick.**—REMOVAL OF HOUSE REFUSE.—Southwick U.D.C. invite tenders for the removal of house refuse from the whole of their district for a period of twelve months from October 1 next. Full particulars and form of tender may be obtained on application to the Surveyor to the Council, Mr. Geo. W. Warr, at the Council Offices, Southwick. Sealed tenders, endorsed "House Refuse Removal," to be delivered to Mr. J. E. Dell, Clerk, Council Offices, Southwick, at the Council Offices on or before August 27.

AUGUST 29.—**Crompton.**—FURNITURE.—Crompton U.D.C. solicit tenders for the supply of furniture required for the new Carnegie Library at Crompton. Quantities, designs, and other information may be had on application to the architect, Mr. Jesse Horsfall, F.R.I.B.A., 4, Chapel-walks, Manchester, and on payment of a deposit of 10s. Sealed tenders, endorsed "Tender for Furniture," must be sent to Mr. F. F. Gartside, Clerk to the Council, Town Hall, Shaw, not later than August 29.

AUGUST 29.—**London.**—PULLING DOWN.—Lambeth Guardians invite tenders for pulling down the iron building formerly used as the Guardians' Offices, etc., situate in Brook-street, Kennington-road, S.E., and for the old material therein. Tenders, which will be received only on the printed form, sealed, and endorsed "Tender for Old Building," must be delivered at offices of Mr. W. Thurnall, Clerk to the Guardians, Guardians' Board Room and Offices, Brook-street, Kennington-road, S.E., not later than 10 o'clock on August 29.

AUGUST 30.—**Wharfedale.**—LEADING STONE.—Wharfedale R.D.C. invite tenders for the leading of stone. The stone to be placed by the side of the several roads when and where required by the Council's Surveyor, and the quantities to be taken from the invoices at 20 cwt. to the ton. Tenders (printed forms of which may be obtained from the surveyor) must be sent to Mr. Edgar C. Newstead, Clerk to the Council, Council Offices, Boroughgate, Otley, by sealed letter, not later than August 30, at noon.

SEPTEMBER 1.—**Handsworth.**—SCHOOL FURNITURE.—U.D.C. of Handsworth Education Committee invite tenders for the furnishing of the following new schools:—(1) Westminster-road Council School, Handsworth; (2) Canterbury-road Council School, Handsworth. Applications for forms of tender, copies of drawings, specifications, etc., should be made on or before September 1, at the offices of the architects, as follows:—Tender No. 1.—Westminster-road School; architect, Mr. J. P. Osborne, 95, Colmore-row, Birmingham. Tender No. 2.—Canterbury-road Schools; architects, Messrs. Wood & Kendrick, High-street, West Bromwich, near Birmingham. A deposit of 1*l.* 1s. must be forwarded with the application for form of tender. Tenders must be forwarded in the endorsed envelopes supplied for that purpose, and must be received on the date stated in the form of tender.—Mr. Thomas H. Moon, Secretary, Education Offices, Soho-hill, Handsworth, Staffs.

SEPTEMBER 1.—**New Brancepeth.**—ELECTRIC LIGHTING.—Brandon and Byshottles U.D.C. invite tenders for the supply and erection of poles, cables, lamps, etc., in connection with electric lighting, New Brancepeth Colliery and Littleburn Sections. Particulars from Mr. G. G. Donkin, surveyor, at his office, Langley Moor, near Durham. Tenders, to be sealed, and marked "Lighting," to reach Mr. John George Wilson, Clerk to the Council, offices, 5, North Bailey, Durham, not later than September 1.

SEPTEMBER 3.—**Margate.**—ELECTRIC LIGHTING.—Margate T.C. invite tenders for the installation of a system of electric light at the Wingham Pumping Station, about six miles from Canterbury, and a mile and a half from Adisham Railway Station. Forms of tender and specification and any further particulars may be obtained from the engineer, Mr. J. A. Forde, 15, Victoria-avenue, Northdown, Margate, on a deposit of 1*l.* 1s. being made. Sealed tenders, endorsed "Electric Lighting," are to be sent in to Mr. Edward Brooke, Town Clerk, Town Clerk's Office, Margate, not later than 1 o'clock p.m. on September 3.

SEPTEMBER 3.—**Stourton.**—FENCING.—Rothwell U.D.C. invites tenders for providing and erecting a wood and iron fencing round the new Sewage Disposal Works at Stourton. Plans and specifications can be seen and particulars obtained at the offices of the engineer, Mr. E. J. Silcock, M.Inst.C.E., 10, Park-row, Leeds. Sealed tenders, endorsed "Stourton Fencing," must be delivered to Mr. W. Dodgson, Clerk to the Council, Council Offices, Rothwell, near Leeds, not later than noon, September 3.

SEPTEMBER 4.—**Belfast.**—FURNITURE.—Belfast Guardians will, at their meeting to be held on September 4, consider tenders for supplying for "The Abbey" Sanatorium, Whiteabbey, the following:—Twenty-one bedroom suites, ten dining-room chairs, five couches, 250 lockers, etc. A printed list of the articles required can be had on application at office of Mr. Joseph W. Robb, Clerk of the Union, Clerk's Office, Union Workhouse. Tender forms can be had on application at office of Clerk. No other form will be received.

SEPTEMBER 4.—**Woodford.**—STEAM ROLLING.—Woodford U.D.C. invite tenders for the hire of steam rollers and scarifiers. Particulars may be obtained on application to Mr. William Farrington, Surveyor to the Council, Council Offices, Woodford Green. Sealed tenders, endorsed "Tender for Steam Rolling and Scarifying," to be delivered not later than noon on September 4.

SEPTEMBER 8.—**Dublin.**—Dublin Lighting Committee invite tenders for the supply and erection of arc lamps and arc lamp pillars. Specification, with general conditions and form of tender, can be obtained from the City Electrical Engineer, Fleet-street, Dublin, on payment of 1*l.* 1s. for each specification. Tenders, addressed "Chairman of the Lighting Committee, 3 Cork-hill, Dublin," and marked "Tender for Arc Lamps and Arc Lamp Pillars," to be delivered not later than September 8.

SEPTEMBER 8.—**Seacroft.**—GAS.—Seacroft Parish Council invite tepders for the supply of gas to fourteen lamps to be erected in York-road, between the City boundary and the Hospitals. Tenders, to include the supply of gas, lighting, extinguishing, cleaning lamps, and renewal of mantles, should be sent on or before September 8, stating price per lamp per year. Forms of tender may be obtained from Mr. James Richard White, Clerk to the Seacroft Parish Council, Cross Gates, Leeds.

SEPTEMBER 10.—**Bishop's Stortford.**—STEAM ROAD ROLLER.—The Bishop's Stortford U.D.C. invite tenders for the supply and delivery of a 10-ton steam road roller. Tenders, accompanied by a complete specification of the roller proposed to be supplied, and stating when it can be delivered, to be sent to Mr. Thomas Swatheridge, Clerk, Council Offices, 7, North-street, Bishop's Stortford, by September 10.

SEPTEMBER 10.—**Ryton.**—CARTAGE.—The Ryton U.D.C. invite tenders for the carriage of road metal from Blaydon Station, Wylam Station, Addison Colliery Siding, or Clara Vale Colliery Siding to the

different parts of their district where it may be required during the year ending September 11, 1907. Particulars may be obtained on application to Mr. John P. Dalton, surveyor, Ryton-on-Tyne, to whom tenders must be delivered before noon on September 10.

SEPTEMBER 14.—**Egypt.**—ROPE, ETC.—Tenders are required by the Egyptian War Department for rope, coil, 19,500 fathoms; rope, hemp, 89,100 fathoms; rope, cotton, 39,600 fathoms; galv. mild steel sheets, 300. Tender forms and specifications may be obtained from Lieut.-Col. J. H. Western, Queen Anne's Chambers, Westminster, and are returnable to him by September 14, and to remain open for thirty days from that date.

SEPTEMBER 15.—**Handsworth.**—ELECTRIC WIRING, ETC.—The U.D.C. of Handsworth invite tenders for the supply and fixing of the following:—Wiring, fittings, etc., for the electric lighting of the new Council schools, Canterbury-road, Handsworth; wiring, fittings, etc., for the electric lighting of the new Council schools, Westminster-road, Handsworth. Drawings, specifications, and conditions of contract may be obtained on and after September 1, from Mr. F. A. Nixon, electrical engineer, Generating Station, Soho-road, Handsworth, on payment of 1*l.* 1s. Tenders, on the prescribed form, must be sealed and forwarded in the endorsed envelope supplied for that purpose, and should be delivered at the Education Offices not later than September 15.

NO DATE.—**Seacroft.**—LIGHTING.—Seacroft Parish Council invite tenders for the supply and fixing of fourteen lamp standards, lamps, and incandescent burners and fittings complete, to be erected in York-road, between the City boundary and the Hospitals. Specifications and forms of tender may be obtained on application to Mr. James Richard White, Lyndhurst, Cross Gates, Leeds.

PAINTING, etc.

AUGUST 27.—**Glasgow.**—PAINTING, DECORATING, ETC.—Glasgow Corporation invite tenders for the cleaning, painting, and decorating of Maryhill Public Halls. Specification and forms of tender may be had on application at the Office of Public Works, City Chambers, 64, Cochrane-street. Sealed tenders, marked outside "Tender for Painting of Maryhill Public Hall," must be lodged with Mr. A. W. Myles, Town Clerk, City Chambers, Glasgow, on or before August 27.

AUGUST 27.—**Hyde.**—PAINTING.—Painting of the Wesleyan Chapel, Norfolk-street, Hyde. Copy of specification on payment of 10s. 6d. from Mr. W. J. Sutcliffe, Globe Works, Godley, Hyde. All tenders to be sent in on or before August 27, marked "Tender for Painting," to Mr. W. Scott, Thornlea, Gee Cross.

AUGUST 30.—**Sunderland.**—PAINTING.—Sunderland Corporation invite tenders for the painting of 180 tramway poles. Specification and form of tender may be obtained on application to the General Manager, at his office, Wheat Sheaf-corner, Monkwearmouth. Tenders, in a sealed envelope, endorsed "Tender for Painting Tramway Poles," must be delivered at office of Mr. Fras. M. Bowey, Town Clerk, Town Hall, Sunderland, not later than 12 noon on August 30.

AUGUST 30.—**Wednesfield.**—PAINTING.—Wolverhampton Guardians invite tenders for certain painting, colour-washing, etc., executing at the Cottage Homes, Wednesfield. Full particulars and forms of specification may be obtained upon application to the Superintendent of the Cottage Homes, Wednesfield. Tenders must be delivered at office of Mr. Frank Harrison, Clerk to the Guardians, Union Offices, Wolverhampton, not later than 10 o'clock on August 30.

SEPTEMBER 1.—**Bournemouth.**—PAINTING.—The Bournemouth Town Council invite tenders for painting the pavilions, cottage, and fences in parks and pleasure grounds, and other works in connexion therewith. Full particulars, forms of tender, and specification can be obtained of Mr. F. W. Lacey, M.Inst.C.E., Borough Engineer and Surveyor, Municipal Offices, Bournemouth, provided that the sum of 1*l.* 1s. has been previously deposited. Tenders to be sent in, in envelopes furnished for the purpose, to the Town Clerk (Mr. Geo. Wm. Bailey), before 10 a.m., September 1.

* SEPTEMBER 12.—**West Ham.**—PAINTING, ETC.—Tenders invited by the Council of the above borough for painting, cleansing, repairs, etc., of public buildings. Specifications, form of tenders, and further particulars of Mr. John G. Morley, Borough Engineer, Town Hall, West Ham, on payment of 1*l.* Tenders to be endorsed "Tender for Painting, etc., Works," and sent to Mr. Fred. E. Hilleary, Town Hall, West Ham, E., by 4 p.m., September 12.

ROADS, SANITARY, AND WATER WORKS.

AUGUST 27.—**Ardsley.**—SEWER.—The U.D.C. of Ardsley, East and West, invite tenders for the construction of about 300 yds. of 9-in. pipe sewer at Hey Beck, West Ardsley. Full particulars may be obtained from the Council's Surveyor, Mr. Edward Brooke, Tingley, Wakefield. Tenders to be sent to Mr. E. H. Middlebrook, Clerk to the Council, Prudential Buildings, Leeds, not later than 10 a.m. on August 27, endorsed "Hey Beck Drainage."

AUGUST 27.—**Felling.**—PAVING WORKS.—The U.D.C. of Felling invite tenders for the paving, etc., of certain streets at Felling. Plans and specification may be seen at the office of the surveyor any morning between 9.30 and 10.30. Tenders must reach Mr. George Bolam, Clerk to the Council, Council Buildings, Felling, County of Durham, not later than August 27, endorsed "Tender for Paving."

AUGUST 27.—**Manchester.**—CULVERTING.—Manchester Corporation Paving, Sewering, and Highways Committee invite tenders for the culverting of the Gore Brook, from Pink Bank-lane to the London and North-Western Railway, Newton Detached. Drawings may be seen, and specification, bill of quantities, and form of tender obtained, on application at the City Surveyor's Office, Town Hall, Manchester, on payment to the City Treasurer of 1*l.* 1s. All cheques or postal orders are to be made payable to the order of "The Corporation of Manchester." Tenders, enclosed in the official envelope, and addressed to the Chairman of the Paving, etc., Committee, to be delivered at the City Surveyor's Office not later than 10 a.m. on August 27.

AUGUST 27.—**Plymouth.**—ROADS.—Plymouth Corporation invite tenders for making-up and completing the following streets and lanes:—Eton-place, section 2; Trelawney-road-lane East. Plans and specifications, and conditions upon which forms of tender will be granted, may be seen at offices of Mr. James Paton, Borough Engineer, Municipal Offices, Plymouth. Sealed tenders must be delivered at the said offices not later than 5 p.m. on August 27.

AUGUST 27.—**Redcar.**—ROADWORKS.—The Redcar U.D.C. invite tenders for levelling, paving, and channelling Hanson-street, Redcar, according to plans and specifications to be seen on application to the surveyor, Mr. Jas. Howcroft, 2, West-terrace, Redcar. Tenders, endorsed "Hanson-street," must be sent to Mr. Alfred H. Sill, Clerk to the Council, on or before August 27.

AUGUST 28.—**Leatherhead.**—ROAD IMPROVEMENTS.—Leatherhead U.D.C. invite tenders for widening, re-forming, kerbing, and providing and laying 1,423 yds. of 12-in. and 9-in. stoneware storm-water drain, in connexion with the improvement of a portion of Kingston main road. Also for the providing and laying of about 300 lin. yds. of 9in. diameter sewer, with all necessary manholes, etc., in the Oxshott-road. The drawings and draft contract may be seen, and copies of the specification, forms of tender, and schedules of work obtained, at the office of Mr. J. E. Smales, Engineer and Surveyor, Council Offices, Leatherhead, upon payment of the sum of 3*l.* 3s. Tenders, sealed, and endorsed "Road Improvement," to be sent, addressed to the Clerk of the Leatherhead U.D.C., on or before 4 p.m. on August 28.

AUGUST 30.—**Edinburgh.**—ROAD WORKS.—Edinburgh Corporation invite estimate for new granite causeway on the carriageway of Melville Drive (west of Marchmont-road), also for hard Whinstone causeway on carriageway of London-road (south side), opposite Parson's Green-terrace. Schedules, specifications, and tender forms may be obtained on application to the City Road Surveyor, City Chambers. Tenders, sealed within the official envelope supplied, must be lodged with Mr. Thomas Hunter, W.S., Town Clerk, City Chambers, by 5 p.m. on August 30.

SEPTEMBER 1.—**Selby.**—CLEANSING DRAINS.—Cleansing and siding of the drains for the year commencing September 6, 1906. The drains will be let in two sections:—No. 1, Selby Dam and all drains south of the Bishop Dyke; No. 2, Bishop Dyke and all drains north thereof. Specifications can be seen, and forms of tender procured, at the Commissioners' Office, Abbey-yard, Selby. Sealed tenders to be sent in on or before September 1.—Mr. Reginald B. Parker, Clerk to the Commissioners, Selby.

SEPTEMBER 1.—**Tadcaster.**—DITCH.—Tadcaster R.D.C. invite tenders for cleaning out portions of a ditch, approximately 435 yds. lin., situate near to the Halton Recreation Ground. Councillor Smithson, of Crossgates, will give any further information on application. Sealed tenders, endorsed "Tender for Ditch," to reach Mr. Geo. A. Bromet, Clerk to the Council, Tadcaster, by September 1.

SEPTEMBER 3.—**Normanton.**—ROADWORKS.—Normanton U.D.C. invite tenders for the kerbing, channelling, flagging, macadamizing, draining, etc., of Cross Queen-street, Normanton. Plans and specifications and full particulars at the Council Offices. Tenders, endorsed "Cross Queen-street," to be sent to Mr. C. B. L. Fernandes, Clerk, Council Offices, Normanton, not later than 9 a.m. on September 3.

SEPTEMBER 3.—**Yeovil.**—ROADWORKS.—Yeovil Corporation invite tenders for the construction of Grove-avenue and a portion of West Park. Plans may be seen, and copies of specifications and forms of tender obtained, at the office of Mr. A. Oddy, Borough Surveyor, Municipal Offices, to whom sealed tenders, endorsed "Grove-avenue" and "West Park" respectively, must be delivered not later than noon on September 3, addressed to the Chairman of the Improvement Committee.

SEPTEMBER 4.—**Lewisham.**—ROADWORKS.—Lewisham Borough Council invite tenders for kerbing, channelling, and metalling the roadway and paving the footpaths with artificial stone (in separate contracts) of Buckthorne-road, Algiers-road, Eddystone-road, and Holdenby-road (part of), Lewisham. The plans and specifications may be seen, and forms of tender obtained, at the Town Hall, Catford (Surveyor's Department). Copies of the specification may also be had on payment of the sum of 5s. in each case, which will not be returned. The tenders must be on forms issued by the Council, enclosed in an envelope, sealed, and endorsed "Tender for ——," and must be delivered by 4 o'clock on September 4 at the Town Hall, and placed in the box there provided for the purpose.

SEPTEMBER 4.—**Tynemouth.**—STREET WORKS.—Tenders are invited for executing the following street works:—(1) Laying tar macadam, etc., in Beverley Gardens, Cullercoats; (2) laying tar macadam, etc., in Drummond-terrace, North Shields. Plans and specifications may be seen at the office of Mr. John F. Smillie, Borough Surveyor, to whom sealed and endorsed tenders are to be sent not later than 12 noon on September 4.

SEPTEMBER 4.—**Uckfield.**—PAVING.—Uckfield U.D.C. invite tenders for about 1,620 sq. yds. of concrete paving, laid in situ at High-street, New Town, and Framfield-road, Uckfield, Sussex, with kerbing and channelling and other works connected therewith. Plans and specifications to be seen and bills of quantities to be obtained, at the Offices of the Council, any day, except Saturday, between the hours of 10 and 4. Tenders to be sent in to Mr. Charles Dawson, Clerk to the Council, Office of the Uckfield U.D.C., Town Hall Chambers, Uckfield, on or before September 4, marked "Tenders for Paving."

* SEPTEMBER 5.—**Hove.**—TAR PAVING.—The Hove Borough Council invite tenders for providing and laying 1,340 yds. superficial tarred macadam in Sackville-road. Specifications may be seen, and particulars, with forms of tender, obtained, at the office of the Borough Surveyor, Mr. H. H. Scott. Tenders, on forms supplied, addressed to the Town Clerk, Town Hall, Hove, and endorsed "Tender for Tar Paving Works," to be delivered before 6 o'clock on September 5.

* SEPTEMBER 5.—**Whiston.**—SEWERAGE WORKS.—The Whiston R.D.C. invite tenders for about 17,390 lin. yds. of glazed earthenware and cast-iron pipe sewers, varying in diameter from 15 in. to 9 in., together with manholes, lamp-holes, flushing chambers, sewage tanks, etc. The drawings may be seen, and copies of the specification and quantities obtained, at the office of the engineer, Mr. John T. Wood, 3, Cook-street, Liverpool, on deposit of 5*l.* Sealed tenders, endorsed "Tender for Sewerage Works," to be delivered to Mr. A. F. Manor, Union Offices, Whiston, Prescot, on or before September 5.

* SEPTEMBER 7.—**Southgate.**—STREET IMPROVEMENTS.—The Southgate U.D.C. invite tenders for (1) paving, kerbing, and channelling several lengths of footpaths at Winchmore Hill and Southgate; (2) for works of private street improvement in Devonshire-road, Palmer's Green. Plans may be seen on application to Council's Surveyor, Mr. C. G. Lawson, from whom copies of the specifications and forms of tender may be obtained on depositing 2*l.* Separate sealed tenders, endorsed (1) "Paving Works" and (2) "Private Street Improvements," must be addressed and delivered to Mr. W. M. Ellenor, Clerk to the Council, Council Offices, Palmer's Green, N., by September 7.

SEPTEMBER 7.—**Tadcaster.**—BORING, ETC.—Tadcaster R.D.C. invite tenders for boring and testing the quantity and quality of water obtainable at the Kiddall Quarry, situate on the Leeds and Tadcaster Road, about two miles from Scholes Station. Further particulars can be obtained on application to Mr. Geo. A. Bromet, Clerk to the Council, Tadcaster. Sealed tenders, marked "Kiddall Water," not later than September 7.

SEPTEMBER 8.—**Burton Latimer, Kettering.**—WATERWORKS.—Kettering R.D.C. invite tenders for the construction of waterworks for the parish of Burton Latimer, as set forth in the following contracts:—Contract No. 1.—The construction of a service reservoir to hold about 119,000 gallons; the laying and jointing of about 6¼ miles of cast-iron pipes, from 8 in. to 3 in. diameter; the fixing of valves and fittings, and alterations to the present pumping station. Contract No. 2.—The supply and delivery of about 560 tons of cast-iron pipes and specials, varying in diameter from 8 in. to 3 in. Contract No. 3.—The supply and delivery of about thirty-seven sluice valves, from 8 in. to 3 in. diameter; twenty air valves, two relief valves, fifty-one screw-down hydrants, together with surface boxes, name plates, and posts. Contract No. 4.—The supply and erection of two 17 B.H.P. gas engines, two suction gas plants, and two sets of three-throw pumps, together with all gearing, pipes, valves, tools, and plant in connexion therewith. The drawings may be seen at the offices of the engineers, Messrs. Everard, Son, & Pick, 6, Millstone-lane, Leicester, from whom conditions, specification, quantities, and form of tender may be obtained upon payment of 2*l.* 2s. for each contract. Sealed tenders upon the form supplied to be sent to the engineers, 6, Millstone-lane, Leicester, not later than 10 o'clock in the forenoon of September 8.

SEPTEMBER 10.—**Batley.**—ROADWORKS.—Batley T.C. invite tenders for the levelling, paving, flagging, channelling, and completing of each of the following streets, namely:—Back Henrietta-street, Ambler-street, Villiers-street, Stralau-street, Prospect-street, Ings-road, and Prince-street, in the said borough. Plans, sections, and specifications of the said works respectively may be seen on application to the Borough Engineer and Surveyor, Mr. Oscar J. Kirby, whose offices are at the Town Hall, Batley. Sealed tenders (on forms which may be obtained from the Borough Surveyor), properly endorsed, to be delivered at office of Mr. J. H. Craik, Town Clerk, not later than September 10.

SEPTEMBER 11.—**Llanfrechfa.**—DRAINAGE.—Llanfrechfa Upper U.D.C. invite tenders for the construction of main sewers and outfall works for their Urban District, comprising about 2,368 lin. yds. of 9-in. and 15-in. stoneware pipe sewers, 141 lin. yds. 9-in. and 15-in. cast-iron pipe sewers, with necessary manholes, settling tanks, etc. Plans may be seen, and copy of specification and bill of quantities obtained, on payment of 2*l.* 2s., at the office of Mr. Isaac Jones, Clerk to the Council, Haddon House, Pontnewydd, Newport, Mon., by whom tenders will be received not later than noon on September 11.

SEPTEMBER 17.—**Llandudno.**—ROAD CONSTRUCTION.—Llandudno U.D.C. invite tenders for the execution of certain works of road construction on land to be known as "Mostyn Broadway." The works comprise surface water drains, macadam roads, gravelled footpaths, laying of kerbs and channels, fencing, etc. Length, about 800 yds.; width, 20 yds. Plans may be seen, and specification, quantities, and form of tender obtained, with all other particulars, upon application to Mr. E. P. Stephenson, Engineer to the Council, Town Hall, Llandudno. A deposit of 1*l.* 1s. (by cash or postal order) is required. Tenders, endorsed "Mostyn Broadway Tender," to be sent in to Mr. Alfred Conolly, Clerk to the Council, Town Hall, Llandudno, on or before 12 noon on September 17.

STONE, MATERIALS, AND STORES.

AUGUST 27.—**Dublin.**—WHINSTONE.—The Corporation of Dublin invite tenders for the supply of broken whinstone to the north side of the city during the period to end on March 31, 1907. Tender forms and the conditions attached to the same may be obtained on application at the Office of the Borough Surveyor, City Hall, on payment of the sum of 1s. Tenders, signed by the tenderer and two solvent sureties, and addressed "To the Chairman of the Supplies Committee," must be delivered to Mr. Henry Campbell, Town Clerk, Town Clerk's Office, City Hall, Dublin, not later than August 27.

AUGUST 27.—**Warrington.**—GRANITE.—Warrington Paving and Sewage Committee invite tenders for 400 tons of 4-in. granite or syenite cubes. Any further information may be obtained at the office of the Borough Surveyor, Town Hall, at which place tenders must be delivered before 12 o'clock on August 27.

AUGUST 29.—**Wigan.**—STORES.—Wigan Corporation

Electric Light and Tramway Committee invite tenders for the supply of cables; timber; overhead line material; electrical accessories; carbons; meters; glass; engine-room stores; paint, varnish, etc.; tram-car accessories; ironmongery; motors. Specifications and forms of tender may be obtained on application to Mr. J. Slevin, Engineer and Manager, Bradford-place, Wigan. Tenders (endorsed with the name of the article tendered for) are to be addressed to the Town Clerk, King-street West, Wigan, and must be received not later than August 29.

AUGUST 30.—**Woking.**—ROAD MATERIAL.—Woking U.D.C. invite tenders for the supply of 1,200 tons, more or less, of 2-in. basalt, to be delivered free at Woking Station during the months of November and December. Tenders, endorsed "Road Material," together with sample of the stone to be supplied, are to be sent to Mr. G. J. Wooldridge, Surveyor, Council Offices, Woking, not later than August 30. Form of tender and other particulars can be obtained upon application.

SEPTEMBER 1.—**Lymington.**—GRANITE.—Lymington Town Council invite tenders for the supply and delivery (by rail or water) of about 225 tons of Guernsey, Cornish, or other granite, broken to 2-in. gauge, and about 25 tons of granite chippings, broken to ¾-in. gauge. Samples to be forwarded to Mr. F. Hill Parr, Borough Surveyor, and tenders (without forms), endorsed "Tender for Granite," to be sent to Mr. J. Davis Rawlins, Town Clerk, Town Clerk's Office, Lymington, Hants, not later than September 1.

SEPTEMBER 4.—**Walsall.**—TRAMWAY SETTS.—The Corporation of Walsall invite tenders for the supply of 5,500 tons of granite setts for tramway purposes, 5 in. by 5 in. by 4 in., varying in length from 5 in. to 9 in. Copies of specification and form of tender may be obtained on application at the Borough Surveyor's Office, Council House, Walsall. Tenders, sealed and endorsed "Tender for Tramway Setts," are to be sent to Mr. John R. Cooper, Town Clerk, Council House, Walsall, on or before September 4.

SEPTEMBER 4.—**Woodford.**—GRANITE.—Woodford U.D.C. invite tenders for the supply of broken Quenast or Guernsey granite of 1½ in. and 2 in. gauge, delivered free in trucks at Woodford and George-lane Stations as and when required until July 31, 1907, in accordance with the specification to be obtained on application. Samples to be delivered free with each tender. Sealed tenders, endorsed "Tender for Broken Granite," to be delivered not later than noon on September 4. Mr. William Farrington, Surveyor to the Council, Council Offices, Woodford Green.

SEPTEMBER 10.—**Bishop's Stortford.**—STEAM ROAD-ROLLER.—The Bishop's Stortford U.D.C. invite tenders for the supply and delivery of a 10-ton steam road-roller. Tenders, accompanied by a complete specification of the roller proposed to be supplied, and stating when it can be delivered, to be sent to Mr. Thomas Swatheridge, Clerk, Council Offices, 7, North-street, Bishop's Stortford, by September 10.

SEPTEMBER 10.—**Dover.**—ROAD MATERIALS.—Dover Town Council invite tenders for the supply and delivery of 1,500 tons of broken Guernsey granite; 250 tons of ¾-in. granite chippings; 250 tons of ¾-in. granite siftings; 300 tons of quartzite. Forms of tender and specification may be obtained at the Office of the Town Clerk, Castle Hill House, Dover. Tenders, endorsed "Tender for Road Material," to be sent to Mr. Wollaston Knocker, Town Clerk, Town Clerk's Office, Castle Hill House, Dover, on or before September 10.

SEPTEMBER 13.—**Gosport.**—MATERIALS.—Gosport and Alverstoke U.D.C. invite tenders for the supply of the following materials, etc., for the year ending September 29, 1907:—Broken stone for macadamising; kerb, channel, and setts; artificial paving stone; stoneware drain pipes; cement and lime; castings; ironmongery; disinfectants; brooms, etc.; forage; repairs to picks, etc.; repairs to harness, etc.; shoeing horses; horse hire, etc.; printing; coal; hospital necessaries; repairs to firemen's boots. Specifications, forms of tender, etc., may be obtained from the Surveyor to the Council, Mr. H. Frost, Town Hall, Gosport. Tenders, sealed and endorsed "Tender for——," as the case may be, should be delivered, with any necessary samples, at the Offices of the Council, not later than 12 o'clock noon on September 13.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*FOREMAN CARPENTER	East African Protectorate	180l., etc.	Sept. 3
*FOREMAN MASON	East African Protectorate	180l., etc.	do.
*CIVIL ENGINEER	Newcastle, Co. Down U.D.C.	Not stated	Sept. 22
*ASSISTANT LECTURER IN ARCHITECTURE	Man. Schl., Technology & Art	150l.	No date

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*DEALS, BATTENS, ETC.—Great Hall, Winchester House, Old Broad-street, E.C.	Churchill & Sims	Aug. 29
*BRICKMAKING MACHINERY, PLANT, ETC., TUNBRIDGE WELLS—On the Premises	Langridge & Freeman	do.
*FREEHOLD BUILD. LAND, RESIDS., ETC., HEMEL HEMPSTEAD—King's Arms Hotel	Walter Greey	Aug. 30
*FREEHOLD BUILDING ESTATE, NEAR LONDON—At the Mart	Robert W. Fuller, Moon, & Fuller	Sept. 12
*BRICKMAKING MACHINERY, PLANT, ETC., NEWPORT, MON.—On the Premises	Chas. E. Parsons & Jolliffe	Sept. 13
*JOINERY WORKS, HENRY-STREET, GRAY'S INN-ROAD	May & Rowden	Oct. 3

SALES OF PROPERTY.—*Continued from page 264.*

By OFFIN & RUMSEY (at Chelmsford).

East Hanningfield, Essex.—The Lodge Farm, 251 a. 0 r. 17 p., f. £2,375

Aug. 14.—By SLEE, SON, & CARDEN (at Masons' Hall Tavern).

Hampton, Middx.—The Red Lion Hotel, f., with goodwill and possession 3,620

Aug. 16.—By STIMSON & SONS.

Tooting.—142, 144, and 146, Upper Tooting-rd. (s.), u.t. 90 yrs., g.r. 35l., y.r. 356l. 10s. 4,610

Camberwell.—143 and 145, New Church-rd., and 11, Canal-bank, area 5,000 ft., f., w.r. 93l. 12s. 710

142, Cold Harbour-la., u.t. 58 yrs., g.r. 7l., e.r. 48l. 400

King's Cross.—Dennis-st., f.g. rents 6l., reversion in 36 yrs. 360

Barnsbury.—Belitha-villas, f.g. rents 8l., reversion in 24 years 420

Hemel Hempstead, Herts.—West Valley-rd., "Springfield," f., p. 100

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

PRICES CURRENT OF MATERIALS.

**** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 10 0	per 1000 alongside, in river.
Rough Stocks and Grizzles	1 7 0	" " "
Picked Stocks for Facings	2 17 6	" delivered.
Flettons	1 8 0	" at railway depôt.
Red Wire Cuts	1 14 0	" " "
Best Fareham Red	3 12 0	" " "
Best Red Pressed Ruabon Facing	5 0 0	" " "
Best Blue Pressed Staffordshire	3 15 0	" " "
Do. Bullnose	4 0 0	" " "
Best Stourbridge Fire Bricks	3 14 0	" " "

BRICKS, &c. (continued).

GLAZED BRICKS.

	£ s. d.	
Best White and Ivory Glazed Stretchers	12 0 0	per 1000, at railway depôt.
Headers	11 0 0	" " "
Quoins, Bullnose, and Flats	16 0 0	" " "
Double Stretchers	19 0 0	" " "
Double Headers	16 0 0	" " "
One Side and two Ends	19 0 0	" " "
Two Sides and one End	20 0 0	" " "
Splays, Chamferred, Squints	20 0 0	" " "
Best Dipped Salt Glazed Stretchers, and Header	12 0 0	" " "
Quoins, Bullnose, and Flats	14 0 0	" " "
Double Stretchers	15 0 0	" " "
Double Headers	14 0 0	" " "
One Side and two Ends	15 0 0	" " "
Two Sides and one End	15 0 0	" " "
Splays, Chamferred, Squints	14 0 0	" " "
Second Quality White and Dipped Salt Glazed	2 0 0	" less than best.

	s. d.	
Thames and Pit Sand	7 0	per yard, delivered.
Thames Ballast	5 6	" "
Best Portland Cement	27 0	per ton, "
Best Ground Blue Lias Lime	19 0	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 6d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE

	s. d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½	" "
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 1	" "
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 2½	" "

	s. d.	
Ancaster in blocks	1 10	per ft. cube, deld. rly. depôt.
Beer "	1 6	" "
Greenshill "	1 10	" "
Darley Dale in blocks	2 4	" "
Red Corsehill "	2 2	" "
Closeburn Red Freestone	2 0	" "
Red Mansfield "	2 4	" "

STONE (continued).

YORK STONE—*Robin Hood Quality.*

	£ s. d.	
Scappled random blocks	2 10	per ft. cube, deld. rly. depôt.
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per ft. super., "
6 in. rubbed two sides ditto, ditto	2 6	" "
3 in. sawn two sides slabs (random sizes)	0 11½	" "
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½	" "
1½ in. to 2 in. ditto, ditto	0 6	" "

HARD YORK—

Scappled random blocks	3 0	per ft. cube, "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 8	per ft. super., "
6 in. rubbed two sides ditto	3 0	" "
3 in. sawn two sides slabs (random sizes)	1 2	" "
2 in. self-faced random flags	0 5	" "

	s. d.	
Hopton Wood (Hard Bed) in blocks	2 0	per ft. cube, deld. rly. depôt.
" " " 6 in. sawn both sides landings	2 7	per ft. super. deld. rly. depôt.
" " " 3 in. sawn both sides random slabs	1 0	" "
" " " 2 in. do.	0 8½	" "

SLATES.

In. In.	£ s. d.	
20×10 best blue Bangor	13 2 6	per 1000 of 1200 at rd.
20×12 " "	13 17 6	" "
20×10 first quality "	13 0 0	" "
20×12 " "	13 15 0	" "
16×8 " "	7 5 0	" "
20×10 best blue Portmadoc	12 12 6	" "
16×8 " "	6 12 6	" "
20×10 best Eureka unfading green	15 17 6	" "
20×12 " "	18 7 6	" "
18×10 " "	13 5 0	" "
16×8 " "	10 5 0	" "
20×10 permanent green	11 12 6	" "
18×10 " "	9 12 6	" "
16×8 " "	6 12 6	" "

TILES.

	s. d.	
Best plain red roofing tiles	42 0	per 1000 at rly. depôt.
Hip and Valley tiles	3 7	per doz. "
Best Broseley tiles	50 0	per 1000 "
Do. Ornamental tiles	52 6	" "
Hip and Valley tiles	4 0	per doz. "

TILES (*continued*).

Best Ruabon red, brown, or brindled	57	6	per 1000	at rly. depót.	
Do. (Edwards)	60	0	,,	,,	
Do. Ornamental do.	4	0	per doz.	,,	
Hip tiles	3	0	,,	,,	
Valley tiles					
Best Red or Mottled Staffordshire	51	9	per 1000	,,	
Do. do. (Peakes)	54	6	,,	,,	
Do. Ornamental do.	4	1	per doz.	,,	
Hip tiles	3	8	,,	,,	
Valley tiles					
Best "Rosemary" brand plain tiles	48	0	per 1000	,,	
Best Ornamental tiles	50	0	,,	,,	
Hip tiles	4	0	per doz.	,,	
Valley tiles	3	8	,,	,,	
Best "Hartshill" brand plain tiles, sand-faced	50	0	per 1000	,,	
Do pressed	47	6	,,	,,	
Do. Ornamental do.	50	0	,,	,,	
Hip tiles	4	0	per doz.	,,	
Valley tiles	3	6	,,	,,	

WOOD.

BUILDING WOOD.	At per standard. £ s. d.			£ s. d.		
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13	10	0	15	0	0
Deals: best 3 by 9	13	0	0	14	0	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	0	0	12	0	0
Battens: best 2½ by 6 and 3 by 6	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less thn best.		
Battens: seconds	0	10	0	,,	,,	
2 in. by 4 in. and 2 in. by 6 in.	9	0	0	10	0	0
2 in. by 4½ in. and 2 in. by 5 in.	8	10	0	9	10	0
Foreign Sawn Boards—						
1 in. and 1¼ in. by 7 in.	0	10	0	more than battens.		
¾ in.	1	0	0	,,		
	At per load of 50 ft.					
Fir timber: best middling Danzig or Memel (average specification)	4	10	0	5	0	0
Seconds	4	0	0	4	10	0
Small timber (8 in. to 10 in.)	3	12	6	3	15	0
Small timber (6 in. to 8 in.)	3	0	0	3	10	0
Swedish balks	2	10	0	3	0	0
Pitch-pine timber (30 ft. average)	4	0	0	4	15	0
JOINERS' WOOD.	At per standard.					
White Sea: first yellow deals, 3 in. by 11 in.	24	0	0	25	0	0
3 in. by 9 in.	22	0	0	23	0	0
Battens, 2½ in. and 3 in. by 7 in.	6	10	0	18	0	0
Second yellow deals, 3 in. by 1 in.	18	10	0	20	0	0
,, ,, 3 in. by 9 in.	17	10	0	19	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	14	10	0
Third yellow deals, 3 in. by 11 in. and 9 in.	13	10	0	15	0	0
Battens, 2½ in. and 3 in. by 7 in.	11	0	0	12	0	0
Petersburg first yellow deals, 3 in. by 11 in.	21	0	0	22	10	0
Do. 3 in. by 9 in.	18	0	0	19	10	0
Battens	13	10	0	15	0	0
Second yellow deals, 3in. by 11in.	16	0	0	17	0	0
Do. 3 in. by 9 in.	14	10	0	16	0	0
Battens	11	0	0	12	10	0
Third yellow deals, 3 in. by 11 in.	13	0	0	14	0	0
Do. 3 in. by 9 in.	12	10	0	14	0	0
Battens	10	0	0	11	0	0
White Sea and Petersburg—						
First white deals, 3 in. by 11 in.	14	10	0	15	10	0
,, ,, 3 in. by 9 in.	13	10	0	14	10	0
Battens	11	0	0	12	0	0
Second white deals, 3 in. by 11 in.	13	10	0	14	10	0
,, ,, 3 in. by 9 in.	12	10	0	13	10	0
,, ,, battens	10	0	0	11	0	0
Pitch pine: deals	18	0	0	21	0	0
Under 2 in. thick extra	0	10	0	1	0	0
Yellow Pine—First, regular sizes	44	0	0	upwards.		
Oddments	32	0	0	,,		
Seconds, regular sizes	33	0	0	,,		
Yellow Pine oddments	28	0	0	,,		
Kauri Pine—Planks, per ft. cube	0	3	6	0	5	0
Danzig and Stettin Oak Logs—						
Large, per ft. cube	0	3	0	0	3	6
Small ,, ,,	0	2	6	0	2	9
Wainscot Oak Logs, per ft. cube	0	5	6	0	6	0
Dry Wainscot Oak, per ft. sup. as inch	0	0	8½	0	0	9½
¾ in. do. do.	0	0	7	—		
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0	0	9	0	1	0
Selected, Figury, per ft. super. as inch	0	1	6	0	2	6
Dry Walnut, American, per ft. super. as inch	0	0	10	0	1	0
Teak, per load	17	0	0	22	0	0
American Whitewood Planks, per ft. cube	0	4	0	0	5	0
Prepared Flooring, etc.—	Per square.					
1 in. by 7 in. yellow, planed and shot	0	13	6	0	17	6
1 in. by 7 in. yellow, planed and matched	0	14	0	0	18	0
1¼ in. by 7 in. yellow, planed and matched	0	16	0	1	0	0
1 in. by 7 in. white, planed and shot	0	12	0	0	14	6
1 in. by 7 in. white, planed and matched	0	12	6	0	15	0
1¼ in. by 7 in. white, planed and matched	0	15	0	0	16	6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0	11	0	0	13	6
1 in. by 7 in. ,, ,,	0	14	0	0	18	0
¾ in. by 7 in. white ,, ,,	0	10	0	0	11	6
1 in. by 7 in. ,, ,,	0	12	9	0	15	0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.			£ s. d.		
Rolled Steel Joists, ordinary sections	7	0	0	7	10	0
Compound Girders, ordinary sections	9	0	0	10	0	0
Steel Compound Stanchions	12	0	0	13	0	0
Angles, Tees, and Channels, ordinary sections	9	0	0	10	0	0
Fitch Plates	9	0	0	10	0	0
Cast Iron Columns and Stanchions including ordinary patterns	7	10	0	8	10	0

METALS.

	Per ton, in London. £ s. d.			£ s. d.		
IRON—						
Common Bars	8	0	0	8	10	0
Staffordshire Crown Bars, good merchant quality	8	10	0	9	0	0
Staffordshire "Marked Bars"	10	10	0	—		
Mild Steel Bars	8	15	0	9	0	0
Hoop Iron, basis price	9	5	0	9	10	0
,, ,, Galvanised	17	0	0	—		
(*And upwards, according to size and gauge.)						
Sheet Iron Black—						
Ordinary sizes to 20 g.	9	10	0	—		
,, ,, 24 g.	10	10	0	—		
,, ,, 26 g.	12	0	0	—		
Sheet Iron, Galvanised, flat, ordinary quality—						
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	14	0	0	—		
Ordinary sizes to 22 g. and 24 g.	14	10	0	—		
,, ,, 26 g.	15	0	0	—		
Sheet Iron, Galvanised, flat, best quality—						
Ordinary sizes to 20 g.	17	0	0	—		
,, ,, 22 g. and 24 g.	17	10	0	—		
,, ,, 26 g.	19	0	0	—		
Galvanised Corrugated Sheets—						
Ordinary sizes 6 ft. to 8 ft. 20 g.	14	0	0	—		
,, 22 g. and 24 g.	14	10	0	—		
,, 26 g.	15	15	0	—		
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11	10	0	—		
Best Soft Steel Sheets, 22 g. & 24 g.	12	10	0	—		
,, ,, 26 g.	14	15	0	—		
Cut Nails, 3 in. to 6 in.	9	10	0	9	15	0
(Under 3 in., usual trade extras.)						

LEAD, &c.

	Per ton, in London. £ s. d.			£ s. d.
LEAD—Sheet, English, 3lb. and up.	19	7	6	—
Pipe in coils	19	17	6	—
Soil pipe	22	7	6	—
Compo pipe	22	7	6	—
ZINC—Sheet—				
Vieille Montagne ton	33	0	0	—
Silesian	32	15	0	—
COPPER—				
Strong Sheet per lb.	0	1	1	—
Thin ,, ,,	0	1	2	—
Copper nails ,,	0	1	0	—
BRASS—				
Strong Sheet ,,	0	1	0	—
Thin ,, ,,	0	1	1	—
TIN—English Ingots ,,	0	1	9	—
SOLDER—Plumbers' ,,	0	0	8½	—
Tinmen's ,,	0	0	10½	—
Blowpipe ,,	0	0	11½	—

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

15 oz. thirds	2¼d.	per ft.	delivered.
,, fourths	1¾d.	,,	,,
21 oz. thirds	3¼d.	,,	,,
,, fourths	2¾d.	,,	,,
26 oz. thirds	4¼d.	,,	,,
,, fourths	3¾d.	,,	,,
32 oz. thirds	5d.	,,	,,
,, fourths	4¼d.	,,	,,
Fluted Sheet, 15 oz.	3¼d.	,,	,,
,, 21 oz.	4¼d.	,,	,,

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

¼ Hartley's	2¼d.	per ft.	delivered.
⅛ ,,	2¾d.	,,	,,
⅜ ,,	3d.	,,	,,
Figured and Oxford Rolled "Oceanic" Glass, white	4d.	,,	,,
Do. ,, tinted	5¼d.	,,	,,

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 1 10
,, ,, ,, in barrels	,,	0 1 11
,, ,, ,, in drums	,,	0 2 1
Boiled ,, ,, in pipes	,,	0 2 0
,, ,, ,, in barrels	,,	0 2 1
,, ,, ,, in drums	,,	0 2 3
Turpentine in barrels	,,	0 3 8
,, in drums	,,	0 3 10
Genuine Ground English White Lead	per ton	22 10 0
Red Lead, Dry	,,	21 10 0
Best Linseed Oil Putty	per cwt.	0 7 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

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TO CORRESPONDENTS.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ABERFAN.—For the erection of a hall, for the trustees of the Methodist Church. Mr. W. Dowdeswell, architect, Treharris:—

Jones Bros.* £1,397 10

AMBLE.—For street improvements in High-street and Percy-street, for the Urban District Council. Mr. W. Gibson, Surveyor, 94, Queen-street, Amble:—

T. B. Wilkie .... £228 7 3 | E. Coulson, Amble* £160 0
R. Canse & Son 203 3 2 |

ARMAGH.—For new system of drainage at the Asylum. Mr. R. H. Dorman, County Surveyor, Armagh:—

D. P. Martin & Co., Armagh £297 10

BRANTHWAITE.—For the erection of a new branch store, for Workington District Industrial and Provident Society. Messrs. W. G. Scott & Co., architects and surveyors, 2, Park-lane, Workington:—

Masons: Wilkson & Miller* £128 10
Joiner: R. Douglas* 110 0
Slaters: J. Lythgoe & Sons* 23 2
Plumber: D. M. Walker* 24 10
Plasterer: G. Mann* 33 0
Glazing and Painting: W. Wildridge* .. 15 0
[All of Workington.]

BUNTINGFORD (Herts).—For constructing new waterworks, for the Rural District Council. Mr. J. Chadwick, engineer, Bletchley, Bucks:—

Grounds & Newton, Page Green, South Tottenham, N.* £3,164 6 2
[Work tendered for on schedule of prices, but total given according to such.]

CASTLE EDEN.—For laying of about 250 yds. of 6-in. and 620 yds. of 9-in. sewers and the construction of small disposal works near Castle Eden village, for Easington Rural District Council. Mr. C. Rule, Surveyor, Haswell:—

J. B. Stott .... £806 0 0 | Makepeace & Valks £603 17 6
G. T. Manners.. 736 0 0 |
J. Carrick..... 727 0 0 | Hall & Wharton 577 13 0

CRICKLADE.—For making alterations to The Old Bear Inn, for Messrs. T. & J. Arkell, Kingsdown Brewery, Swindon. Messrs. Drew & Sons, architects, 28, Regent-circus, Swindon, Wilts:—

Tydeman Bros... £485 0 0 | J. Lay, Swindon* £436 5 0
P. Chick ..... 450 0 0 |

DODDINGTON.—For alterations and enlargement of the Council school at Doddington, near Faversham, for the Kent Education Committee. Mr. Wilfrid H. Robinson, architect:—

E. Bishop, Albany-road, Sittingbourne* .. £715

DURHAM.—For providing and laying a 3-in. cast-iron water main to Coxhoe-square, for the Rural District Council. Mr. G. Gregson, Surveyor to the Council:—

J. Carrick .... £381 0 0 | R. Oliver, Durham* £365 11 10
[Surveyor's estimate, £384.]

EAST HETTON.—For reconstructing street channels, for Durham Rural District Council. Mr. G. Gregson, Surveyor:—

Beevers & Clark £229 3 11 | J. Carrick, Durham* £149 10 3
R. Oliver .... 165 11 2 |
[Surveyor's estimate, £150.]

FRINTON-ON-SEA.—For the erection of a residence in Hind-avenue, for Mr. Ronald. Messrs Homer and Lucas, architects, 35, Bucklersbury, E.C.:—

W. Godden* £1,233

HEREFORD.—For the erection of a villa residence and stables on the Moor Park Estate, Hereford. Mr. H. Skyrme, architect, Widemarsh-street, Hereford:—

E. T. Davies, Hereford* £525

HAMPTON.—For making up and paving Warfield-road, for the Urban District Council. Mr. S. H. Chambers, Surveyor, Public Offices, Hampton, Middlesex :—

R. W. Swaker ..	£321 7 4	T. Free & Sons	£163 8 3
J. Mowlem & Co., Ltd.	201 0 0	M. Thacker & Co.	161 5 6
T. Watson, jun.	197 0 0	E. & E. Iles....	157 11 3
S. Kavanagh & Co.....	176 18 6	Hardy, Bate, & Co.....	152 17 6
W. Shepherd & Sons	173 1 9	S. Gibbons	152 15 4
T. Adams.....	168 12 0	Fry Bros.....	149 14 4
W. H. Wheeler	168 10 1	S. Atkins, Kingston-on-Thames*	141 16 2

HEREFORD.—For the erection of a pair of semi-detached villas at Fownhope, near Hereford, for Mr. H. C. Rowberry. Mr. H. Skyrme, architect, Widemarsh-street, Hereford :—

	Villas.	Rainwater, Tanks, etc.
J. Hiles	£701 10 0	£55 0 0
Stone Bros.	698 14 6	93 2 6
E. Davies	635 0 0	68 0 0
W. Powell, Hereford*	615 0 0	76 0 0

HERNE BAY.—For making-up Marine Drive (western portion), for the Urban District Council. Mr. F. W. J. Palmer, Surveyor, Town Hall, Herne Bay :—

T. Adams	£5,837 0 0	C. Castle & Co.	£4,444 16 6
J. Browning..	5,389 0 0	C. A. Zadig & Co.....	4,158 0 0
A. & B. Hanson	4,986 0 0	Hardy, Bate, & Co. Slough, Bucks*	4,093 6 0
S. H. Head ..	4,933 0 0		
Ingleton Bros.	4,753 19 0		
W. Johnson ..	4,450 0 0		

HITCHIN.—For erecting new stables at Victoria-road, for Mr. G. Maidment. Mr. J. Shilcock, architect, Hitchin :—

W. & A. Foster ..	£252 10	F. Abbiss.....	£214 10
F. A. Young & Co.	250 0	F. J. Bailey.....	214 0
A. B. N. Bridges..	242 16	M. Foster & Co. ..	183 0
Evans, McLeod, & Co.	233 0	J. S. Launder	178 0
W. Permain.....	225 0	C. F. Sherren	153 0

INVERKEITHING.—For laying about 200 yds. of 9-in. metal sewer pipe at Inverkeithing Bay to west of Paper Mill, for the Town Council. Mr. J. C. Sim, architect, Inverkeithing :—

Carlingnose Granite Co. ..	£220 0 0	J. Martin.....	£172 14 8
D. Stewart	174 18 0	A. Robertson, Hillend, Inverkeithing*	164 7 9

KIRTON.—For erecting a villa residence :—

J. Comer	£299 10	S. Parker & Son, Wainfleet*	£269 0
J. H. Cader	289 10		
Langley & Son ..	275 0		

LAMPETER PETERWELL.—For improvements and repairs and erecting classroom and cloakroom, etc., to girls' school, for Cardigan County Education Committee. Mr. G. Dickens-Lewis, County Architect, 12, Terrace-road, Aberystwyth :—

W. Jones	£495	L. Davies, Bryn-road Lampeter*	£305
J. D. Owen	387		

LETCHWORTH.—For proposed house for Mr. F. Francis, at Green-lane, Garden City, Herts. Messrs. Stonebridge & Foll, architects and auctioneers, Woburn Sands :—

Raban & Sons ..	£645 0	A. Collins.....	£543 0
F. Newton	599 0	Beckley & Turpie	497 10
Foster & Co.	585 0		

MAIDSTONE.—For erecting a new depot, stables, and foreman's cottage, Mill-street, for the Corporation. Mr. T. F. Bunting, Borough Surveyor, Fair Meadow, Maidstone :—

E. T. Jeffery	£6,227 10 11	J. H. Goodwin	£5 072 12 4
G. Pearce & Sons	5,470 0 0	Elmore & Son	5,038 0 0
W. T. Burrows	5,244 10 10	Cox Bros. ..	4,898 0 0
H. J. Smith & Son	5,143 0 0	R. Corben & Co.	4,867 0 0
Barden & Head	5,098 0 0	G. E. Wallis & Sons, Ltd.	4,797 0 0
		R. Avard* ..	4,629 0 0

[All of Maidstone.]

PONTLOTTYN.—For erecting two houses at Farm-road, for Messrs. Lewis & Morgan. Mr. P. Vivian Jones, architect and surveyor, Hengoed, via Cardiff :—

G. Jones	£989 8 6	T. Davies	£870 0 0
Francis	915 0 0	D. J. Vaughan, Tredegar, Mon.†	810 0 0
Davies & Francis	881 0 0		
Heatherly	870 0 0		

SHERBURNE.—For constructing sewage purification works at Sherburne, for Durham Rural District Council. Mr. G. Gregson, Surveyor to the Council :—

R. Oliver	£1,497 17 9	J. Carrick, Durham*	£1,212 4 8
J. Arrundale's representatives	1,347 0 0	R. C. Birtley	1,129 9 8

[Surveyor's estimate, £1,300.]

UPPINGHAM.—For 560 yds. of stoneware pipe sewer, etc., at Glaston, for the Rural District Council. Mr. F. R. Chapman, Sanitary Surveyor, Glaston-road, Uppingham :—

A. E. Mould ..	£237 8 8	J. Chapman & Son	£153 8 0
W. Emerson ..	210 0 0	Cannam Bros.	133 4 10
J. Woolston ..	205 0 0	E. M. Dorman, Uppingham*	104 16 9
Joyce Bros. ..	187 0 0		
E. S. Ireson ..	185 0 0		
J. Dalby & Sons	180 0 0		

WHITLEY.—For the extension of farm premises, Lane Top. Messrs. C. H. Marriott, Son, & Shaw, engineers and architects, Church-street-chambers, Dewsbury :—
W. H. Clegg, Builder, Webster-hill, Dewsbury.. £215 6‡
[‡ Lowest tender.]

WORKINGTON.—For erecting and completing mission buildings at Westfield, for Messrs. Chamberlain & others. Mr. J. N. Singleton, architect, 110, Scotch-street, Whitehaven :—
H. Killip, Harrington* £273 17 0
[Without painting and seating.]

WORKINGTON.—For alterations and additions to the Wesleyan Mission Hall, Westfield. Messrs. W. G. Scott & Co., architects, 2, Park-lane, Workington. Quantities by the architects :—

Mason : G. Mann, Workington*	£54 17 0
Joiner : H. Graham, Harrington*	144 12 11
Slaters : J. Lythgoe & Son, Workington*	14 7 0
Plasterer : G. Mann, Workington*	34 12 0
Plumber : Pape & Co., Workington*	29 0 0
Painter, etc.: T. D. Kearlside, Workington*	49 0 0
Heating Alterations : H. Skidmore, Workington*	7 15 0

LIST OF TENDERS FOR CWMDU CHURCH.—In printing this list in our last issue the printers misplaced the note referring to the highest tender, viz., that the value of old timber had not been calculated therein, so as to make it refer to the lowest tender; and the note referring properly to this latter, viz., that it was accepted, was omitted.

ELECTRIC WIRING FOR BRENTFORD UNION, ISLEWORTH.—We are asked to state that the electric light contract in connexion with the buildings at Isleworth for the Guardians has been secured by Messrs. Strode & Co., Osnaburgh-street, Regent's Park, N.W. Their tender amounted to £849.

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